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U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service • National Institutes of Health • National Cancer Institute

HE 20. 3173/2:

CENTRAL NERVOUS SYSTEM NEOPLASMS

1. UTILITY OF THE PROVISIONAL CLINICAL DIAGNOSIS AS A BASIS FOR SELECTION OF COMPUTED TOMOGRAPHIC OR RADIONUCLIDE BRAIN SCAN.

Kim EE, Domstad PA, Choy YC, DeLand FH
Univ. Texas Medical Sch. 2437 JP, 2437 JP 1203 Ross Sterling Ave., Houston, TX, 77030
J Natl Med Assoc; 73(9):805-809 1981

Based on provisional clinical diagnosis, the choice of computed cranial tomography (CCT) or radionuclide brain scan (RBS) was retrospectively evaluated. In 1,333 selected cases, 551 had CCT only, 560 had RBS only, and 222 had both. CCT was the clinician's preference in cases of dementia, hydro cephalus, hemorrhage, aneurysm, arteriovenous malformation, primary tumor, visual abnormality, coma, and multiple sclerosis. RBS was preferred in headache, syncope, seizure, transient ischemic attack, metastatic disease, and encephalitis. Neither procedure appeared preferable in cases of psychosis, psychiatric disease, cerebral vascular accident, and abscess. Thirty-eight percent of CCTs yielded abnormal findings, not necessarily correlated with the provisional diagnosis. Thirty percent of RBS showed positive findings, mostly related to vascular abnormalities. On the basis of the provisional clinical diagnosis, CCT was more frequently requested for probable structural changes and RBS for probable perfusion abnormalities. (Author abstract) (6 Refs)

DIGESTIVE NEOPLASMS

2. GALLIUM IMAGING IN CANCER OF THE ESOPHAGUS.

Pearlman AW
Dept. Nuclear Medicine, Hosp. Joint Diseases, North General, 1919 Madison Ave., New York, NY, 10035
Clin Nucl Med; 6(8):380-383 1981

Ga-67-citrate scintigraphy was used in 17 patients with carcinoma of the esophagus as part of the preoperative evaluation. Intense concentration in the primary site was associated with an extensive tumor. In all patients but one in whom resection was attempted, the tumors were found to be unresectable. Gallium scintigraphy proved valuable in diagnosing metastatic foci below the diaphragm and in the left supraclavicular fossa. Of special interest were three patients in whom esophagoscopy and contrast radiography suggested a benign stricture. All had intense concentration of gallium at the esophagogastric junction, an indication that proved to be carcinoma. (Author abstract) (9 Refs)

3. AN EVALUATION OF 99MTC PERTECHNETATE SCANNING FOR THE DETECTION OF COELIAC DISEASE AND CROHN'S DISEASE.

Holt S, Taylor TV, McLoughlin GP, Heading RC, Tothill P
Dept. Medicine, Div. Gastroenterology, Univ. Alberta, 8-104A Clinical Sciences Building, Edmonton, Alberta T6G 2G3, Canada
Eur J Nucl Med; 6(8):361-364 1981

The small intestinal accumulation of 99mTc pertechnetate was studied in 117 adult patients of whom 21 had coeliac disease (9 men, 12 women; 27-66 yr old), 13 had Crohn's disease (3 men, 10 women; 19-57 yr old), and 83 had gastroduodenal disease but no known small bowel pathology (51 men, 32 women; 20-77 yr old). Of the 83 patients with gastroduodenal disease, 5 had gastric cancer. The results indicated that scintiscanning with 99mTc pertechnetate does not provide a consistently reliable method for the detection of small bowel pathology. (10 Refs)

4. THE VALUE OF LIVER SCINTIGRAPHY IN THE MANAGEMENT OF PATIENTS WITH SUSPECTED GASTRIC CANCER. A PROSPECTIVE, CONSECUTIVE STUDY.

Christensen M, Jakobsen PM, Johansen P
Dept. Clinical Physiology, Aalborg Hosp., Aalborg, Denmark
Acta Chir Scand; 147(4):269-270 1981

Patients with gastric cancer and liver metastases are believed not to benefit from gastric resection. In 43 patients with strong suspicion of - or proven - gastric cancer, fit for elective, radical surgery, preoperative liver scintigraphy was performed, in an attempt to select patients with liver metastases before laparotomy. Liver scintigraphy identified six out of seven patients with metastases. One patient with massive steatosis had a false-positive scintigram. Percutaneous scan-guided fine-needle aspiration biopsy verified four true positive scintigrams. True-positive scintigrams in two patients heralded a change in the planned treatment. We consider that a preoperative liver scintigraphy in a population thus selected is beneficial in the planning of treatment: only patients with a negative scan-guided fine-needle aspiration biopsy should be operated upon. (Author abstract) (6 Refs)

ENDOCRINE NEOPLASMS

5. CLINICAL EVALUATION OF ULTRASONIC EXAMINATION OF THYROID TUMORS, WITH REFERENCE TO THE CORRELAION BETWEEN ULTRASONIC EXAMINATION AND HISTOLOGICAL FINDINGS.

Kishimoto S, Kitamura H, Higashitsuji H, Ushio N, Hayashi M, Takamaru M
Dept. Otorhinolaryngology, Faculty Medicine, Kyoto Univ., Sakyo-ku, Kyoto 606, Japan
Jibi Inkoka Rinsho; 74(Suppl):724-735 1981

For diagnosis of thyroid tumors, palpation, x-ray, radioisotope-scintigram and biopsy have been employed. They are, however, insufficient for determining the tumor characteristic, and cause several side effects, such as spreading tumor cells and hemorrhage. In order to obtain more accurate information about thyroid tumors without any serious side effects, we evaluated 223 patients with thyroid tumors by B-mode ultrasonography, and examined 84 of them for correlation between the results of ultrasonography and the histological findings. (1) On the basis of the presence or absence of echoes within the tumor pictures, the tumors were classified as solid, cystic or mixed type. The solid type tended to be malignant, but the cystic type tended to be benign with a few exceptions. (2) On the basis of echo structures within the tumor pictures, the tumors were classified as coarse and non-uniform or fine uniform type. The latter echo has been considered to indicate benignancy. However, in 45% of those tumors malignancy was proved histologically. (3) On the basis of a marginal echo structure between the tumor and the surrounding tissue, the tumors were

classified as smooth or irregular type. The latter type tended to be malignant, but the former type tended to be benign, with a few exceptions. There were nine patients with malignant tumors, four with cysts and five with encapsulated tumors. From these findings, we conclude that the classification of ultrasonographic echoes described in (1) and (3) is valuable in determining the characteristics of thyro id tumors. (36 Refs) (In JPN)

6. DETECTING METASTASES OF DIFFERENTIATED THYROID CARCINOMA BY A SERUM THYROGLOBULIN RADIOIMMUNOASSAY USING SENSITIVE THYROGLOBULIN ANTIBODY. PRELIMINARY RESULTS.

Bednar J, Nemec J, Pichova D, Rohling S, Holusova J
Res. Inst. Endocrinology, Prague, Czechoslovakia
Radiochem Radioanal Lett; 48(6):341-353 1981

Serum thyroglobulin (TG) was measured in 117 patients with differentiated thyroid carcinoma and in 104 controls. A modified radioimmunoassay employing a highly specific TG antibody was used. Patients were grouped according to complete or partial thyroidectomy and presence or absence of 131I-concentrating or non-131I-concentrating metastases. Patients in whom no metastases had been detected clinically or by scanning showed a range of TG levels near control (78/84 less than 110 ug/l TG). Those with detected metastases showed enhanced TG levels (27/33 greater than 110 ug/l TG). Test results could not eliminate a significant number of false positive and negative results. Normal-appearing TG levels in non-metastatic thyroidectomized patients were possibly the result of residual TG-producing tissue that was not detectable by 131I uptake. The TG radioimmunoassay appeared to be more sensitive than scanning in detecting metastases. No definitive conclusions could be made, but the assay provided useful information which could supplement other findings. (30 Refs)

7. SERUM THYROGLOBULIN IN THYROID CANCER.

Black EG, Gimlette TM, Maisey MN, Cassoni A, Harmer CL, Oates GD, Hoffenberg R
(c/o Hoffenberg) Dept. Medicine, Univ. Birmingham, Queen Elizabeth Hosp., Edgbaston, Birmingham B15 2TH, England
Lancet; 2(8244):443-445 1981

Serum thyroglobulin (Tg) was measured in 274 patients with differentiated thyroid cancer; 266 had previous thyroidectomy, which had been followed by ablative iodine-131 in 183 cases. Neither the presence nor the titer of anti-Tg antibodies appeared to effect Tg assays. Serum Tg reflected the presence or absence of cancer in 83% of 164 patients not receiving thyroxine (T4). This concordance improved to 97.5% in 158 patients tested while receiving T4. Thirty four patients in remission were tested both on and off T4 therapy; in all these patients the Tg level when receiving T4 was less than 5 ug/l. In 19 of 21 patients with cancer T4 treatment did not suppress Tg. Serum Tg thus provides an excellent marker for the presence or absence of thyroid cancer in patients taking T4, even if anti-Tg antibodies are present. It is proposed that monitoring of patients by assay of serum Tg should supplant routine assessment by radioactive-iodine scans of the neck or whole body. (Author abstract) (14 Refs)

8. SONOGRAPHIC DIAGNOSIS OF THYROIDAL AND PARATHYROIDAL DISEASES.

Lorenz D, Van Kaick G
Institut fur Nuklearmedizin, Deutsches Krebsforschungszentrum, Im Neuenheimer Fe ld, D-6900 Heidelberg, W. Germany
Roentgenpraxis; 34(8):315-323 1981

In the diagnosis of the thyroid and parathyroid sonography is employed subsequent to scintigraphy and before aspiration biopsy. A healthy thyroid is characterized by a regular finely granulated echo pattern. Of the benign thyroidal diseases, stromas, cysts, scars, calcifications, and solid scintigraphically cold nodes have distinct sonographic patterns and can be morphologically classified. The echo pattern of carcinomas, however, can resemble a benign cold node. Their incidence rate (5%) is as great as that of cysts and solid tissue changes. Differentiated carcinomas show an poor echo reflection pattern of low intensity. Similar patterns can be observed in cases of toxic adenoma and thyroiditis. For final differential diagnosis, histologic analysis is necessary. Metastases in the thyroid are characterized by circumscript sharply limited, poor echo areas. Lymphomas can be easily confused with a liquid mass in a sonogram. Autonomous adenomas show cystic changes, scars and/or calcifications. In cases of unilateral scintigraphic visualization of the thyroid, differential diagnosis can be made with sonography. (19 Refs) (In GER)

GENITOURINARY NEOPLASMS

9. SKELETAL SCINTIGRAPHY FOR THE OBSERVATION OF COURSE AND TREATMENT OF CARCINOMA OF THE PROSTATE.

Palst HW, Langhammer H, Schmid L, Sinterman R
Nuklearmedizinische Klinik und Polyklinik, Klinikum rechts der Isar der Technischen Universitat Munchen, Ismaninger Str. 22, 8000 Munchen 80, W. Germany
ROEFO; 135(1):44-49 1981

A total of 338 patients with histologically-confirmed carcinoma of the prostate were studied. Of these, 259 were free of metastases at the outset of the study. Scintigraphy was carried out 1/4-1/2, or, at the most, 1-yr intervals and continued for over 4 yr. Metabolic activity of metastases as reflected by radioisotope uptake was measured using 99mTc-labelled pyrophosphate or diphosphonate. Scintigraphic pictures were made of the dorsal and ventral aspects of the pelvis. Patients were followed during treatment by orchiectomy and/or cytostatics and/or estrogen. Each yr 4.7-10.2% of the patients developed bone metastases. Tumors were reduced or eliminated in 60.6%, remained unchanged in 16.6%, and progressed in 22.8% of the patients. Scintigraphy was shown to be a useful tool for showing the course of prostate carcinoma and its response to treatment. (28 Refs) (In GER)

HEAD AND NECK NEOPLASMS

10. 67GA-SCINTIGRAPHY IN HEAD AND NECK TUMORS.

Tomoda K
Dept. Otolaryngology, Kansai Medical Univ. Moriguchi, Moriguchi, Japan
Jibi Inkoka; 53(3):207-212 1981

Confirmation of the diagnosis of head and neck tumors in 99 patients was obtained by 67Ga-scintigraphy (Ga-Scin). Scintigraphic accuracy in tumor diagnosis and location ('positive-rate') was evaluated. Total body scans of patients without tumor in the head and neck provided 'control' information on physiological accumulation of 67Ga in this area. High 'positive rate' was recorded in malignant tumors of the parotid glands or other organs. Considering 'positive rate' in conjunction with other diagnostic methods and in a context of determined physiological accumulation, Ga-Scin is indicated in the evaluation of head and neck tumors as follows: (1) Parotid gland tumors, tumors of the neck, and suspected malignant lymphomas are the best subjects for Ga-Scin. (2) Ga-Scin is of limited use in tumors of the paranasal sinuses and thyroid gland. (3) Ga-Scin is of little value in tumors of the nasal cavity, tongue, oral cavity, pharynx and larynx. (Author abstract) (32 Refs) (In JPN)

HEMATOLOGIC, RETICULOENDOTHELIAL, AND LYMPHATIC NEOPLASMS

11. NUCLEAR MEDICINE STUDIES IN EVALUATION OF SKELETAL LESIONS IN CHILDREN WITH HISTIOCYTOSIS X.

Siddiqui AR, Tashjian JH, Lazarus K, Wellman HN, Baehner RL
Div. Nuclear Medicine, Dept. Radiology, Indiana Univ. Medical Center, Indianapolis, IN, 46223
Radiology; 140(3):787-789 1981

Radiographs were compared with 99mTc scans of the bones and bone marrow as well as 67Ga-citrate scans to evaluate their sensitivity in identifying skeletal lesions in 21 children with histiocytosis X. Seven of 20 bone scans were completely normal in patients with extensive radiographic evidence of skeletal disease. In only one patient were bone scan changes demonstrated prior to radiographic abnormalities. None of the lesions was 'cold' on the bone scans. 99mTc-sulfur colloid bone marrow scans and 67Ga-citrate whole-body scans were not valuable. Radiographic survey of the skeleton should be the primary diagnostic test employed in patients with histiocytosis X who have suspected skeletal lesions. Bone scans should be obtained only when the radiographs are normal or equivocal. (Author abstract) (24 Refs)

12. RADIONUCLIDE INVESTIGATION OF RENAL FUNCTION IN PATIENTS WITH LYMPHOGRANULOMATOSIS IN RELATION TO RADIATION THERAPY.

Kholin VV, Volkov AA, Kovrizhkina TA
State Postgraduate Medical Inst., Central Res. Inst. Roentgeno-Radiology, USSR Ministry Health, Leningrad, USSR
Vopr Onkol; 27(6):13-17 1981

An analysis of the results of renography in 68 patients with lymphogranulomatosis is presented. In 57 patients, a radionuclide investigation of renal function was carried out after irradiation of the spleen, paraaortic and iliac lymph nodes. Renograms were evaluated both qualitatively and quantitatively. The investigation established an impaired renal function in 18% of the patients examined prior to radiation therapy. According to radionuclide renography, the excretory function of the tubular renal apparatus remains quite satisfactory after partial irradiation of the kidneys in a dose of 38-40 G y. (Author abstract) (7 Refs) (In RUS)

13. CESSATION OF TREATMENT IN CHILDHOOD ACUTE LYMPHATIC LEUKAEMIA.

Metz O, Stoll W
Universitats-Kinderklinik, Kochstr. 2, DDR-6900 Jena, E. Germany
Dtsch Med Wochenschr; 106(33):1026-1029 1981

Cytostatic long-term treatment for about 36 mo was administered to 18 children with acute lymphatic leukemia who were in long-term remission (43-98 mo). Prophylaxis of meningosis involved intrathecal 198Au colloid and methotrexate. Seven recurrences occurred during the long-term remissions: the bone marrow was involved 6x, leukemic meningosis occurred once. Five out of seven recurrences occurred within 1 yr of cessation of treatment. There were no complications induced by intrathecal radio-gold, such as the apathy syndrome or leukencephalopathy. Intrathecal methotrexate led to side effects before administration of radio-gold: encephalopathy twice, paraplegia once. Symptoms regressed completely in two children, one child with encephalopathy continues to have symptoms. All three children were given 198Au colloid intrathecally thereafter which was tolerated very well. 198Au colloid represents an alternative for prophylaxis of meningosis with 60Co telecobalt irradiation in leukemias and non-Hodgkin lymphomas in childhood. (Author abstract) (21 Refs) (In GER)

MUSCULOSKELETAL NEOPLASMS

14. THE INDICATIONS FOR AND LIMITATIONS OF BONE SCINTIGRAPHY IN OSTEOGENIC SARCOMA: A REVIEW OF 55 PATIENTS.

McKillop JH, Etcubanas E, Goris ML
(c/o Goris) Div. Nuclear Medicine, Stanford Univ. Medical Center, Stanford, CA, 94305
Cancer; 48(5):1133-1138 1981

The value of radioisotope bone scanning at the time of presentation and serially during follow-up has been evaluated in 55 patients with biopsy-proven osteogenic sarcoma. Many of the patients studied were treated with adjuvant chemotherapy. Bone metastases were detected at presentation in only one patient and in a second patient, proximal extension of the primary tumor not evident on radiographs was demonstrated by the radioisotope technique. During follow-up, 20 patients experienced bone metastases and each had an abnormal bone scan. Eleven of these patients were asymptomatic for bone metastases at the time the scan became abnormal. Seven patients experienced bone metastases as their first site of tumor recurrence. The detection rate for soft tissue metastases was low, but the scan indicated stump recurrence in three patients. Although the yield is small, bone scanning is justified at presentation because the results may profoundly alter the management. During follow-up, routine bone scans are indicated in all pa-

tients, whether they have symptoms or not. (Author abstract) (13 Refs)

15. DIFFERENTIATION OF RIB FRACTURES FROM METASTASES BY BONE SCANNING.

Harbert JC, George FH, Kerner ML
Div. Nuclear Medicine, Dept. Radiology, Georgetown Univ. Hosp., Washington, DC, 20007
Clin Nucl Med; 6(8):359-361 1981

The bone scans of 471 cancer patients revealed 103 (22%) with one or more rib lesions. Of 69 patients who had serial studies, 5 (7%) had proven rib fractures, 13 (19%) had probable fractures, 25 (36%) had proven metastases, and 26 (38%) had probable metastases. By analyzing the intensity and appearance of rib lesions in serial bone scans, it was concluded that there is a high probability that rib lesions detected by bone scanning are fractures if (1) they are focal as opposed to linear, and (2) they decrease in intensity within 3 to 6 mo or they are aligned so as to involve two or more ribs in the same location. (Author abstract) (9 Refs)

RESPIRATORY AND CARDIOVASCULAR NEOPLASMS

16. RADIOAEROSOL INHALATION LUNG CINE-SCINTIGRAPHY: A PRELIMINARY REPORT.

Isawa T, Teshima T, Hirano T, Ebina A, Konno K
Dept. Medicine, Tohoku Univ., Res. Inst. Chest Diseases and Cancer, Sendai 980, Japan
Tohoku J Exp Med; 134(3):245-255 1981

Radioaerosol inhalation lung cine-scintigraphy was used to explore mucociliary clearance mechanisms in the lungs of 30 patients with bronchogenic carcinoma, obstructive lung disease such as pulmonary emphysema and/or chronic bronchitis, bronchiectasis, and seven normal volunteers. Seven areas of interest were selected: a perihilar region covering the large airways, a peripheral lung region, an intermediate lung region, the carina between the first two regions, the trachea, the whole right lung, and the whole left lung. The method involved inhalation of ultrasonically generated 99mTc-human serum albumin aerosol in less than 2 min with tidal breathing through a mouth-piece with the nose clipped, and the measurement of radioactivity over the thorax and trachea for approx 2 hr continuously and after 3 hr. The measurement of the inhaled radioaerosol was then displayed cinematographically. Time curves or clearance curves were drawn by a computer for each area of interest after correcting physical half-life. Mucous velocity over the airways was then measured by comparing the movement of radioactivity as a lump over an area of interest with that over a more distal area of interest. In bronchogenic carcinoma excessive radioactivity was found at the site and usually kept increasing with time. (27 Refs)

17. CLINICAL USEFULNESS OF 67GA UPTAKE RATIO MEASUREMENT IN LUNG CANCER.

Sugawara T, Tanaka O, Iguchi H
Dept. Radiology, Jichi Medical Sch., Minamikawachi-machi, Tochigi Prefecture 329-04, Japan
Nippon Igaku Hoshasen Gakkai Zasshi; 41(6):539-543 1981

Uptake ratios of 67Ga-citrate were measured in 21 primary lung cancers, of which vol-doubling times (DT) were simultaneously determined from sequential films taken at a mo interval or so pri or to treatment. This analysis was to determine whether 67Ga-citrate uptake ratio was a useful technique to assess growth rate of tumor. Uptake ratio was expressed as ratio of net cpm of the tumor to that of corresponding region in the opposite lung field, and corrected by the tumor vol and by the attenuation factor related with tumor depth. Study has demonstrated the presence of the significant negative correlation (p less than 0.001) between tumor uptake ratios with 67Ga and DTs, that is, net uptake ratio was increased with a decrease in DT. The different types of lung cancers were ranked with regard to their increasing uptake ratios: adenocarcinoma, squamous cell carcinoma and anaplastic carcinoma, while DTs were decreasing inversely. It was also observed that, in squamous cell carcinoma, increase in tumor vol caused decrease of 67Ga tumor uptake ratio. Measurement of 67Ga-citrate tumor uptake ratio is considered to contribute to estimate the rate of tumor growth. (Author abstract) (17 Refs) (In JPN)

18. IMPROVED VISUALIZATION OF LUNG TUMORS BY COMPUTED SUBTRACTION SCINTIGRAPHY WITH 67GA-CITRATE AND 113MIN-CHLORIDE.

Fadeev NP
N. N. Petrov Res. Inst. Oncology, Leningrad, USSR
Med Radiol (Mosk); 26(7):69-71 1981

The diagnostic efficacy of computed subtraction scintigraphy with 67Ga-citrate and 113mIn-chloride was evaluated in 25 patients (20 men, 5 women, 38-70 yr old) with lung cancer. The use of 113mIn-chloride reduced the radioactive background created by 67Ga-citrate and thus improved the visualization of lung tumors. (13 Refs) (In RUS)

MISCELLANEOUS

19. RADIONUCLIDE EJECTION FRACTION IN DOXORUBICIN CARDIOTOXICITY.

Morgan GW, McIlveen BM, Freedman A, Murray IP
Inst. Oncology and Radiotherapy, Prince of Wales Hosp., Randwick, Sydney, New South Wales 2031, Australia
Cancer Treat Rep; 65(7/8):629-638 1981

Serial assessment of cardiac function by radionuclide ejection fraction (EF), using a 'first pass' technique, was performed prior to each dose in 292 patients receiving doxorubicin. Detailed analysis was undertaken in 98 patients, consisting of all 91 patients who had received greater than 200 mg/m2 (m2) and 7 with risk factors (RFs) who had received between 100 and 200 mg/m2. Thirty-two patients had RFs and 66 had no risk factors (NRFs). RFs were (a) cardiovascular disease, (b) mediastinal irradiation within 6 mo of starting doxorubicin treatment, and (c) total doxorubicin dose greater than 550 mg/m2. The criteria for discontinuing doxorubicin were EF less than 0.40 in RF patients or less than 0.35 in NRF patients or decrease in EF of greater than or equal to 0.14 over three successive readings. In the NRF group, no patient met these criteria nor did any develop cardiac failure. In the RF group, discontinuation was indicated in eight patients; two stopped receiving doxorubicin at total doses of 730 mg/m2 and 680 mg/m2, respectively, and it was discontinued in the other six at total doses ranging from 120 to 420 mg/m2. Prior to the first dose of doxorubicin, all patients should have a baseline EF and assessment of RFs. An EF study is required before each subse-

quent dose in patients with RFs or with initial EF less than 0.45, but in the remaining patients, serial studies are not required until there is a cumulative dose of 450 mg/m2. Use of these guidelines and our criteria for discontinuation may prevent development of doxorubicin cardiotoxicity. (Author abstract) (25 Refs)

20. CLINICAL STUDIES WITH IN-111 BLEDTA, A TUMOR-IMAGING CONJUGATE OF BLEOMYCIN WITH A BIFUNCTIONAL CHELATING AGENT.

Goodwin DA, Meares CF, DeRiemer LH, Diamanti CI, Goode RL, Baumert JE, Sartoris DJ, Lantieri RL, Fawcett HD

Nuclear Medicine Service, Veterans Admin. Medical Center, 3801 Miranda Ave., Palo Alto, CA, 94304

J Nucl Med; 22(9):787-792 1981

Indium-111 BLEDTA, a bleomycin analog containing an EDTA group, was used for tumor imaging in 110 patients with cancer. Scans with In-111 BLEDTA agreed with biopsy results in 75 of 95 patients (79% accuracy). A positive scan was obtained in 71 of 88 patients with a positive biopsy (81% sensitivity). In 21 of 95 patients (22%), the scan revealed tumor sites that had not been detected. The main limitation to visualization was the size of the tumor (1.5-2.0 cm diameter was the smallest size seen). Background radioactivity in the liver, spleen, and bone marrow also made tumor detection in these areas more difficult. The cause of this background, and of false-positive uptake in sites of inflammation, is correlated with specific radiolabeling of polymorphonuclear WBC by In-111 BLEDTA. Means of eliminating this background are discussed. (Author abstract) (18 Refs)

SELECTED PRE-CLINICAL STUDIES

21. LOCALIZATION OF HUMAN TUMOUR XENOGRAFTS AFTER I.V. ADMINISTRATION OF RADIOLABELLED MONOCLONAL ANTIBODIES.

Moshakis V, McIlhinney RA, Raghavan D, Neville AM

Ludwig Inst. for Cancer Res., Royal Marsden Hosp., Sutton, Surrey SM2 5PX, England

Br J Cancer; 44(1):91-99 1981

A mouse monoclonal antibody (LICR-LON/HT13) has been developed to a cell-surface antigen carried on a human germ-cell tumor xenograft (HX39). After radioiodination, the antibody localized in vivo preferentially in xenografted tumors as opposed to normal mouse tissue, whereas tumor uptake did not occur with normal mouse IgG or nonspecific monoclonal IgG. This selective localization could be abolished by simultaneous injection of an excess of the unlabeled LICR-LON/HT13. The kinetics of and factors influencing localization have been examined. Tumor wt was important in that the smaller the tumor the better the localization. LICR-LON/HT13 was found to localize also in other xenografted germ-cell tumors, but not in non-germ-cell tumor xenografts. Thus monoclonal antibodies are capable of selective in vivo localization of human tumors in an animal model, and their clinical value should now be assessed. (Author abstract) (24 Refs)

22. ACCUMULATION OF RADIOISOTOPES WITH TUMOR AFFINITY: II. COMPARISON OF THE TUMOR ACCUMULATION OF 67GA-CITRATE AND 201TL-CHLORIDE IN VITRO.

Muranaka A

Div. Nuclear Medicine, Dept. Radiology, Kawasaki Medical Sch., Dept. Radiology, Kurashiki 701-01, Japan

Acta Med Okayama; 35(2):85-101 1981

Kinetics and various factors affecting the accumulation of 67Ga-citrate (Ga) and 201Tl-chloride (Tl) in HeLa S3, human ovary embryonic AS II, normal human fibroblast, and Yoshida sarcoma (YS) tumor cells were studied in vitro. Ga uptake in YS was gradual and linear between 3 and 24 hr, showing dose response without saturation at 5 uCi/ml. Excretion decreased as incubation times grew longer. Tl was rapidly taken up by YS, with approx constant uptake between 0.5-24 hr and rapid excretion independent of incubation time. The uptake of Tl by all cell types was 2.0-2.8x that of 42KCl; constancy of the ratio indicated correlation of uptakes. Tl uptake was inhibited (percentage of dose/10(6) cells dropped from 1.26 to 0.89) after addition of 1 milliM ouabain and decreased to 2-4% of control in heated, non-viable cells. Active transport involving Na-K ATPase appears to be involved in the tumor accumulation of Tl. Administration of the anticancer agents mitomycin C, adriamycin, 5-fluorouracil, and neocarzinostatin inhibited cell proliferation at all concentrations studied, but did not significantly affect the uptake of either Tl or Ga in any of the cell lines. Ga uptake was dependent on transferrin (Tf) concentration and highest at 50 ug/ml Tf in HeLa S3 cells. Tf seems to participate in the tumor cell accumulation of Ga. (19 Refs)

23. AUTORADIOGRAPHIC VISUALIZATION OF THE RETENTION OF 169YB-CITRATE IN BONE AND ITS REMOVAL BY DRUGS.

Chu SP, Jiang J

Dept. of Radiotoxicology, Suzhou Medical Coll., Suzhou, People's Republic of China

Zhongguo Yaoli Xuebao; 2(1):64-66 1981

The ytterbium radioisotope, 169Yb, accumulates selectively in tumors and in the skeleton. The retention of 169Yb-citrate (Yb-C) in bones and its removal by drugs in male white ratsare described. Using autoradiography, Yb-C was found to accumulate in the organic matter of the bones such as the periosteum, endosteum, and marrow. Twenty-four hr after iv administration, Yb-C was seen to accumulate mainly in the renal cortex. Treatment with DTPA (diethylenetriaminepentaacetic acid) and quinamic acid greatly decreased its concentration in the kidney. The excretion of Yb-C can be explained by the fact that the drugs quickly form water-soluble complexes with 169Yb which are excreted through the kidney. A t the same time, these danger lower the resorption of 169Yb complexes by the renal canaliculi. (6 Refs) (In CHI)

24. PHARMACOKINETIC STUDIES ON THE INTRAVENOUS SUSPENSION OF A NEW HEPATOSPLENOGRAPHY AGENT.

Ma Y, Mei F, Luo M, Xi N, Chen X

Dept. Pharmacy, Shanghai First Medical Coll., Shanghai, People's Republic of China

Yaoxue Xuebao; 16(3):218-224 1981

Using contrast agents in the early diagnosis of hepatic tumors has been an important aspect of radiographic research. Since 1965, numerous compounds have been synthesized and

tested among which 2,4,6-triiodo-3-acetamidobenzoic acid (N-cyclohexylcarbamyloxy) ethyl ester (TABAC) has been shown effective in correctly diagnosing hepatic carcinoma in mice, rabbits, dogs, and in five human cases. Results are described for the pharmacokinetic studies on an I131 labeled TABAC suspension administered iv (600 mg/kg) to male rats. Following administration, an initial rapid decrease of serum radioactivity followed by a slow decrease was observed. The blood level curve fitted a 2-compartment open model and the kinetics could be described by an exponential equation. Following administration of TABAC, a rapid increase of liver radioactivity was observed, which showed an absorption peak 45 min after injection; the kinetics of the liver-drug-time curve could be described by an exponential equation. Organ distribution studies showed that approx 70% of the total radioactivity administered accumulated in the liver. Much of the radioactivity (71.4%) was excreted from the body (44.7% in urine; 26.7% in feces) 96 hr after TABAC administration. (8 Refs) (In CHI)

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Nuclear Medicine

SERIES CT02 No. 82/02 FEBRUARY, 1982

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DIGESTIVE NEOPLASMS

1. BENIGN FOCAL DISEASES OF THE LIVER.

Sandler MA, Marks DS, Hricak H, Madrazo BL, Petrocelli RD
Dept. Diagnostic Radiology, Henry Ford Hosp., 2799 W. Grand Blvd., Detroit, MI, 48202
Semin Ultrasound; 2(3):202-211 1981

The diagnosis of five benign focal diseases of the liver by radionuclide studies (RS) and by gray scale ultrasonography (US) is reviewed. US is useful as a second evaluation after RS when the latter are questionable or identify nonspecific lesions. US is the imaging modality of choice for hepatic cysts. US is important in the early diagnosis of pyogenic liver abscesses, and subsequent dec rease in associated mortality. The US features of iver cell adenomas (LCA) and focal nodular hyperpla-

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sia (FNH) have not been extensively reported. The US and RS findings of both LCA and FNH appear to be variable, contrary to expectation, and not always different from one another; a possible differential diagnosis based on both RS and US is given. When a diagnosis of cavernous hemangioma is suspected from initial RS, the most diagnostic subsequent study is hepatic scintiangiography with delayed blood pool imaging; the US features will be variable and nonspecific. (50 Refs)

2. FUNCTIONAL STATE OF THE LIVER IN PATIENTS WITH IDIOPATHIC MYELOFIBROSIS (SUBLEUKEMIC MYELOSIS).

Klimova NF, Suvorova EV, Aksenova OV, Lebedeva EA
Dispensary-Polyclinic Dept., Central Inst. Hematology and Blood Transfusion, Moscow, USSR
Probl Gematol Pereliv Krovi; 26(8):48-50 1981

Functional state of the liver was studied in 46 patients (19 men, 27 women; 42-70 yr old) with subleukemic myelosis. Major clinical manifestations of the disease were pronounced spleno- and hepatomegaly. Liver scintigraphy with 298Au and 111In showed even distribution of the isotope in 9 patients (Group I), diffuse changes in 17 (Group II), and diffuse-focal changes in 20 (Group III). The patients in Groups II and III showed similar changes in the biochemical indices of liver activity (decrease of albumin level, increase of gamma-globulin level, increase of the indices of thymol test, increase of alkaline phosphatase activity, and inhibition of the excretory liver function). (1 Ref) (In RUS)

3. THE RADIOLOGICAL DIAGNOSIS OF GALLBLADDER DISEASE. AN IMAGING SYMPOSIUM.

Berk RN, Ferrucci JT, Fordtran JS, Cooperberg PL, Weissmann HS
Dept. Radiology, Univ. California, 225 Dickinson St., San Diego, CA, 92103
Radiology; 141(1):49-56 1981

Changes in the radiological diagnosis of gallbladder disease are occurring at a remarkable rate. In this symposium, several recognized authorities place the various diagnostic modalities and their interrelation in modern perspective. The present and future roles of oral cholecystography and iv cholangiography, the radiological diagnosis of chronic acalculous cholecystitis, and the use of ultrasonography and cholescintigraphy are analyzed. (Author abstract) (63 Refs)

ENDOCRINE NEOPLASMS

4. REEVALUATION OF NEEDLE ASPIRATION CYTOLOGY IN DETECTION OF THYROID CANCER.

Rosen IB, Wallace C, Strawbridge HG, Walfish PG
Univ. Toronto, 600 University Ave., Suite 445, Toronot, Ontario, M5G 1X5, Canada
Surgery; 90(4):747-756 1981

From July, 1978, to August, 1980, 379 patients with thyroid disease were assessed clinically and underwent scintiscanning and needle aspiration cytology. One hundred fifty-three patients were selected for operation; there were 138 solid lesions and 15 cystic lesions. Selection criteria included clinical factors as well as cytology results. There was a cancer rate of 33% and a neoplasia rate of 92%. In the solid lesions there was a 36% incidence of cancer, whereas the incidence was 27% in cystic lesions. There was a false positive rate of 1%. A false negative rate could be viewed in various ways. Twenty-four cancers were missed in benign cytology for an incidence of 25%; however if one excluded the cytologic abnormal group, as some authors do, labeling them as potential malignancies, false negative results occurred in the cytologic benign cases for a rate of 4% for the entire group. If noncystic benign lesions alone were considered, the false negative rate would be 1%. False negative reporting arises predominantly from the inability to differentiate follicular adenoma from adenocarcinoma in cytology. Other factors such as geographic miss cystic disease also play a role. If one is to avoid underdiagnosis and undertreatment of thyroid cancer, one should consider cellular aspirates as potentially malignant and subject to surgical excision. Needle aspiration cytology has an unassailable role in the management of the patient with thyroid disease but requires interpretation in the light of clinical and scintiscanning results. (Author abstract) (10 Refs)

5. DISAPPEARANCE OF 131I UPTAKE FROM 'HOT' THYROID NODULES FOLLOWING TSH STIMULATION.

Fanfani G, Pasculli D, Meiel M, D'Addabbo A
(c/o D'Addabbo) Cattedra di Medicina nucleare, Ospedale Consorzial Policlinico, Piazza G. Cesare, 70124 Bari, Italy
Radiol Med (Torino); 67(10):763-766 1981

Homeostasis and autoregulation mechanisms were studied in interglandular, functional relationships of 'hot' thyroid nodules, which after thyroid stimulation hormone (TSH) was given, stimulation become scintigraphically 'cold'. Of 73 patients with hyperfunctioning adenomas, only 25 showed decrease or disappearance of 131I from 'hot' nodule after TSH stimulation. This change was very pronounced in 8, evident in 6, and appreciable in 11. Different hypotheses, morphological and functional characteristics were discussed. These type of hyperfunctioning adenomas do not have autonomy due to their sensitivity to TSH, and exhibit peculiar histologic and ultrastructural characteristics. (12 Refs) (In ITA)

6. IMPROVED QUALITY OF THYROID SCINTIGRAMS BY USING A GAMMA CAMERA AND PIN-HOLE COLLIMATOR.

Anger K, Feine U, Kaiser E
Nuklearmedizinische Abteilung des Medizinischen Strahleninstituts, Universitat Tubingen, Rontgenweg 11, D-7400 Tubingen, W. Germany
ROEFO; 135(2):188-192 1981

Thyroid scintigraphy with rectilinear scanner and with scintillation camera with pin-hole collimator (SCPC) was compared in 25 patients examined with 99mTc for diagnostic purposes (Group 1) and in 42 patients 3-5 days after radioiodine treatment. The findings obtained by the two methods were identical in 8/25 cases in Group 1 and in 19/42 cases in Group 2, but SCPC yielded additional clinical information in 8/25 and 10/42 cases, respectively. The SCPC method has a higher resolution than the scanner method. Diffuse goiter often showed additional cold nodules or areas with increased radioactivity, ie, microadenomas. Central cold areas were visualized by SCPC in some cases which were solitary adenomas in the rectilinear scan. (8 Refs) (In GER)

7. THE SIGNIFICANCE OF I-131 SCAN DOSE IN PATIENTS WITH THYROID CANCER: DETERMINATION OF ABLATION: CONCISE COMMUNICATION.

Waxman A, Ramanna L, Chapman N, Chapman D, Brachman M, Tanasescu D, Berman D, Catz B, Braunstein G
Dept. Nuclear Medicine, Cedars-Sinai Medical Center, 8700 Beverly Blvd., Los Angeles, CA, 90048
J Nucl Med; 22(10):861-865 1981

Twenty-four patients with differentiated thyroid cancer were studied with diagnostic I-131 neck and chest scans after having undergone bilateral subtotal thyroidectomy and initial I-131 therapy with either 30-or 100-mCi doses. With an endogenous stimulation protocol, follow-up studies were performed with neck and chest scans using 2 and 10 mCi I-131. A 400% increase in sensitivity was found with a 10-mCi dose relative to a 2-mCi dose. Comparison with therapeutic doses of 30 and 100 mCi resulted in further increases in the detection of residual iodine-avid tissue. We conclude that a 2-mCi or lower dose of I-131 is inadequate in evaluating residual iodine-avid tissue visually in patients with thyroid cancer. The study does not answer the critical question of whether it is necessary to treat a patient presenting a negative 2-mCi but a positive 10-mCi scan. It may be appropriate to define ablation visually as well as clinically, with further studies directed toward determining a treatment rationale in this patient population. (Author abstract) (16 Refs)

8. CLINICAL USEFULNESS OF 201TL-CHLORIDE SCINTIGRAPHY FOR THE PREOPERATIVE IDENTIFICATION OF THE ABNORMAL PARATHYROID.

Nakanishi F, Kasuga T, Kobayashi T, Makiuchi M, Miyakawa M
Dept. Radiology, Faculty Medicine, Shinshu Univ., Matsumoto-shi, Nagano Pref. 390, Japan
Kaku Igaku; 18(3):309-314 1981

Preoperative scintigraphy with 201Tl-chloride was performed in seven patients with hyperparathyroidism. The diagnostic usefulness of 201Tl-chloride in the parathyroid tumors was proved by the results of surgical explorations. In seven patients 10 lesions were identified at operation. Eight of these 10 lesions were correctly predicted on the preopertive scintigraphy. Overactive lesions of the parathyroid were clearly visualized from 5 to 30 min after administration of 201Tl-chloride. The abnormality was better recognizable with simultaneous presentation of 201Tl-chloride image and 99mTc04-thyroid image and/or subtraction image. (28 Refs) (In JPN)

GENITOURINARY NEOPLASMS

9. LOCALISATION OF MALIGNANT GERM-CELL TUMOURS BY EXTERNAL SCANNING AFTER INJECTION OF RADIOLABELLED ANTI-ALPHA-FETOPROTEIN.

Halsall AK, Fairweather DS, Bradwell AR, Blackburn JC, Dykes PW, Howell A, Reeder A, Hine KR
(c/o Fairweather) Immunodiagnostic Res. Lab., Dept. Immunology, Univ. Birmingham Medical Sch., Birmingham B15 2TJ, England
Br Med J; 283(6297):942-944 1981

Sheep IgG antibody to alpha-fetoprotein was labeled with 131I and used to identify human germ-cell tumors by emission scanning. Eleven patients were studied after resection of their primary tumors. Ten had malignant teratoma and 1 an endodermal sinus tumor. All eight patients with raised serum alpha-fetoprotein concentrations had metastases apparent in the antibody scans. Of the remaining three patients with normal serum alpha-fetoprotein concentrations, two had positive scans. Three of the patients with positive results were scanned twice; the second scans were negative after treatment, when the alpha-fetoprotein concentrations had returned to normal. These results suggest that antibody scans are useful in the clinical management of patients with germ-cell tumors. (Author abstract) (12 Refs)

10. NUCLEAR MEDICINE.

Merrick MV, Stone AR, Chisholm GD
Dept. Nuclear Medicine, Western General Hosp., Edinburgh, Scotland
Recent Results Cancer Res; 78:108-118 1981

The major application of nuclear medicine in the diagnosis and management of cancer of the prostate is in the detection of skeletal metastases. Primary carcinoma can be imaged by nonspecific cancer-seeking agents, the incorporation of inorganic Zn, labeled estrogens, or labeled antibodies: however, none of these techniques are particularly useful for prostate cancer. Lymphoscintigraphy is useful for visualizing lymph nodes. The incidence of skeletal metastases at autopsy in patients with carcinoma of the prostate has bee reported to be between 50 and 70%. Bone scanning agents and imaging equipment are reviewed. The bone scan has high sensitivity but very low specificity. In one series, abnormal scans were found in 8/24 patients with T0 disease. The incidence increases as the T category increases, reaching 69% in patients with T4 disease. Fourteen patients of a total of 100 had abnormal scans but no radiographic evidence of metastatic disease. Of 59 patients staged M1 at presentation, 54 had abnormal bone scans. The value of the bone scan in follow-up is debatable, since it is impossible to state in any given case to what extent a reduction in detected activity represents a true reduction in osteoblastic function, and to what extent it represents increased bone density. Bone scanning remains the most valuable single test in staging of carcinoma of the prostate, and probably has an important role during follow-up. (23 Refs)

GYNECOLOGIC NEOPLASMS

11. LYMPH SCAN WITH RADIONUCLIDES IN GYNECOLOGIC TUMORS..

Tang J, Chen S, Zhang Y, Zhang X, Yu G, Liu Z
Isotopes Unit, Ritan Hosp., Chinese Acad. Medical Sciences, Beijing, People's Republic of China
Zhonghua Zhongliu Zazhi; 3(1):42-45 1981

Radionuclide scanning of lymphatics using Au-198 colloids is described for 40 of 224 cases studied between 1976 and 1978. There were 35 cases of recurrent squamous carcinoma of the cervix, 2 cases of recurrent ovarian carcinoma, 1 case of recurrent squamous carcinoma of the vulva and 2 others. In 30 of the 40 cases renography were simultaneously performed. The positive diagnostic rate for lymphatic scintigraphy was 27/30 while that for renography was 20/30, showing that the diagnostic conformation rate was higher for lymphatic scintigraphy. The positive rate was raised to 29/30 when the two technics were combined. The overall positive rate in the series was 37/40. It is concluded that lymphatic scanning with radionuclides is a simple and noninvasive method that can be repeatedly used to evaluate treatment results and in patient follow-up. Changes in the lymph scan can also reflect lympha-

tic functions. The limitation of this technic is that it produces a rougher picture of the lymphatics as compared to lymphography with iodized oils and gives certain number of false negative results. Three illustrative cases are given, and the technic is discussed. (11 Refs) (In CHI)

12. SCINTIGRAPHIC ASSESSMENT OF THE SPREAD OF NEOPLASTIC PROCESS IN CANCER OF THE UTERINE CERVIX BY MEANS OF 57CO-BLEOMYCIN IN THE LIGHT OF EXPERIMENTAL AND CLINICAL DATA.

Pertynski T
Zaklad Medycyny Nuklearnej i Radiobiologii, AM, Ul. Sterlinga 5, 91-425 Lodz, Poland
Ginekol Pol; 52(5):487-491 1981

The 57Co-bleomycin complex was found to accumulate with predilection in squamous epithelial carcinoma of the skin and vagina in mice. Scintigraphy with 57Co-bleomycin proved to be a sensitive method for establishing the progression of the disease in 62 patients with carcinoma of the uterine cervix. (no Refs) (In POL)

HEMATOLOGIC, RETICULOENDOTHELIAL, AND LYMPHATIC NEOPLASMS

13. IMPORTANCE OF NUCLEAR MEDICAL METHODS IN MONITORED SERIES OF PATIENTS WITH HODGKIN'S DISEASE.

Dienstbier Z, Masopust J, Bechyne M, Foltynova V, Kocmerzevska H
Inst. Biophysics and Nuclear Medicine, Faculty of General Medicine, Charles Univ., Salmovska 3, 12000 Prague, Czechoslovakia
Radiobiol Radiother (Berl); 22(3):359-365 1981

Seventy-three patients with malignant lymphogranuloma (Hodgkin's disease) were monitored between 1970 and 1980. A total of 714 radionuclide examinations and 831 verifications by other means were performed in the course of diagnosis, determination of the extent of disease, follow-up of therapy, and diagnosis of relapse. Methods used included isotope indirect lymphography using 198Au colloid, 67Ga scintigraphy, liver scintigraphy using 99m-Tc sulfur colloid, 198Au sulfide colloid, or 113m-In colloid, pulmonary vascular perfusion using 99m-Tc or 131I, bone scanning with 99m-Tc pyrophosphate or 85 SrCl2, bone marrow scintigraphy with 99m-Tc sulfur colloid or 111In, radioisotope renography, or spleen scintigraphy with 99m-Tc-labeled erythrocytes. Results of isotopic studies were compared with x-ray, biochemical, and hematological studies done not more than 3 mo before or after the isotopic studies. The highest correlation with studies not using isotopes was obtained with 67Ga scanning (84.7%). The lowest was obtained with liver scintigraphy (63.5%). Isotopic lymphography, because of its relative simplicity, proved useful for diagnosis a detection of relapse. Bone scintigraphy proved useful for detecting metastatic tumor involvement. Liver scintigraphy results were often nonspecific. (15 Refs)

14. RADIOISOTOPIC STUDY OF SOME ORGANS AFTER RADIOTHERAPY ON THE UPPER ABDOMEN.

Romanini A, Galli G, D'Errico G, Carlesimo M, De Renzis C
Istituto di Radiologia, Universita Cattolica - Policlinico A. Gemelli, Via della Pineta Sacchetti, 526, 00168 Roma, Italy
Radiol Med (Torino); 67(10):757-761 1981

Morphological and functional changes in liver and kidney were studied: before upper abdominal radiotherapy, immediately after, and followed up at different time intervals to evaluate observed alterations. Twenty five patients 17-55 yr old (13 females, 12 males; 12 in Stage II and 13 in Stage III) with Hodgkin's disease underwent clinical examination and surgery. All patients received approx 45 Gray radiotherapy. Patients underwent nephrography, renal plasmatic flux, glomerular filtration, liver scintigraphy with 99Tcm colloids, liver function with 131I-Bengal rose, and pancreas scintigraphy. The experimental results indicated possible left liver lobe damage in younger patients and transitory impairment of some renal function (glomerular filtration reduction). (49 Refs) (In ITA)

15. THE MIGRATORY PROPERTIES OF INDIUM-111 OXINE LABELLED LYMPHOCYTES IN PATIENTS WITH CHRONIC LYMPHOCYTIC LEUKAEMIA.

Wagstaff J, Gibson C, Thatcher N, Crowther D
Dept. Medical Oncology, Christie Hosp., Holt Radium Inst., Wilmslow Road, Manchester M20 9BX, England
Br J Haematol; 49(2):283-291 1981

These studies describe the application of a new method for following the migration of autologous lymphocytes in normal subjects and patients with chronic lymphocytic leukemia (CLL). There is evidence that Indium 111 oxine is a reliaole radioactive cell label for in vivo studies of lymphocyte traffic in man. In normal subjects, where 60-70% of the lymphocytes labeled are T cells, the results are different from those of previous workers. The lymphocytes leave the blood initially but later return to it. It is believed that this is due to the reappearance of cells which at first entered the spleen. It is suggested that the difference between these data and those of Hersey (1971) is due to the failure of lymphocytes in the latter studies to return to the blood after primary migration. In CLL no such reappearance in the blood is seen and the lymphocytes do not leave the spleen in significant numbers over 48 hr. This suggests that CLL B cells either do not recirculate through spleen or that their transit time is greater than 48 hr. Bone marrow localization in CLL patients is greater than in the normal subjects, suggesting that either a larger proportion of the neoplastic B lymphocytes enter this compartment or their transit time through it is longer than the transit time of a normal T cell predominant population. Localization in normal-sized lymph nodes in patients with CLL is less than that in the lymph nodes of normal subjects. This may possibly be explained by the greater propensity of T lymphocytes to enter lymph nodes than B lymphocytes, or by the altered migratory properties of CLL B lymphocytes as compared with normal B cells. (Author abstract) (17 Refs)

16. COMBINED GATED CARDIAC BLOOD POOL SCINTIGRAPHY AND 67GA-CITRATE SCINTIGRAPHY FOR DETECTION OF CARDIAC LYMPHOPROLIFERATIVE DISORDERS.

Winzelberg GG, Rapoport F, Boucher CA, Carey RW, Mckusick KA, Strauss HW
Div. Nuclear Medicine, Shadyside Hosp., 5230 Centre Ave., Pittsburgh, PA, 15232
Radiology; 141(1):191-192 1981

Two cases are reported in which combined radionuclide imaging using gated cardiac blood pool scintigraphy and 67Ga-citrate scintigraphy aided in evaluating lymphomatous involvement of the heart and distinguishing tumor involvement from other cardiac disorders. (Author abstract) (5 Refs)

MUSCULOSKELETAL NEOPLASMS

17. PERIOSTEAL DESMOID OF THE METAPHYSIS; DIFFERENTIAL DIAGNOSIS FROM MALIGNANT BONE TUMORS BY BONE SCINTIGRAPHY.

Feine U, Ahlemann LM

Nuklearmedizinische Abteilung, Medizinisches Strahleninstitut der Universitat, Rontgenweg 11, D-7400 Tubingen, W. Germany

ROEFO; 135(2):193-196 1981

Radiographic findings (cortical spicule and small cortical erosions) suggested osteogenic sarcoma of the distal femur in three children (two boys and one girl, 8-13 yr old), for whom the other clinical and anamnestic findings were typical for periosteal desmoid. The bone scans, performed for differential diagnosis, were definitely negative in all three cases, which ruled out the malignant nature of the process, and the diagnosis of periosteal desmoid was retained. The diagnosis was confirmed by the clinical course in all cases. The findings indicate the value of negative bone scan in the differential diagnosis between a malignant tumor and a periosteal desmoid. (12 Refs) (In GER)

RESPIRATORY AND CARDIOVASCULAR NEOPLASMS

18. IS RADIONUCLIDE BRAIN SCANNING AN ADEQUATE EVALUATION FOR CEREBRAL METASTASES IN ASYMPTOMATIC LUNG CANCER PATIENTS?

Wilson MA

Section Nuclear Medicine D4/332, Univ. Wisconsin Hosp. and Clinics, 600 Highland Ave., Madison, WI, 53792

Wis Med J; 80(8):26-28 1981

Radionuclide (RN) scanning was reviewed in 486 tumor cases to determine whether investigation and management are hampered by use of RN rather than computerized tomography (CT). Among 162 patients receiving RN brain scans, 73 had lung cancer and 89 had other tumors. Brain scans were normal in 149 cases and abnormal in 13. All patients with abnormal scans also showed focal neurological signs. Of patients with normal scans 136 had no mention of neurological signs. Among 379 neurologically intact cases found in the literature, 12 abnormal scans were obtained. No statistical differences in the ability to detect intracranial metastases were found between RN and CT. CT was established as superior to RN for detecting intracranial tumors in general. When supratentorial metastases were considered, RN produced a false negative result in 15% of cases while CT produced only 6% false negatives. Neurologically intact candidates for lung cancer surgery did not seem to be inadequately evaluated when RN was used because of lack of CT facilities. RN was reported as more sensitive than CT in detecting dural metastases. The relative effectiveness of thorough neurological assessment by a neurologist in place of either scanning method was undetermined. Use of RN or CT is discouraged in neurologically intact patients with nonpulmonary tumors. (16 Refs)

19. VENTILATION-PERFUSION LUNG SCANNING IN PATIENTS DETECTED BY A SCREENING PROGRAM FOR EARLY LUNG CARCINOMA.

Katz RD, Alderson PO, Tockman MS, Stitik FP, Buchanan J, Rosenberg N, Wagner HN

Dept. Radiology, Sinai Hosp., Belvedere and Greenspring Ave., Baltimore, MD, 21215

Radiology; 141(1):171-178 1981

Ventilation-perfusion (V-P) lung scans obtained in 114 patients in a screening program for the early detection of lung cancer were reviewed, and abnormalities were correlated with radiographic and surgical findings. Eighty-seven patients eventually had a tissue diagnosis of carcinoma; 65 (75%) had a perfusion defect and 56 (67%) had a ventilation abnormality at the tumor site. Lobar or segmental perfusion abnormalities were present at the tumor site in 2 of 13 patients whose lung cancer could not be localized by chest radiographs. However, 12 of these 13 patients and 54% of those with radiographically visible lesions had perfusion abnormalities in other lung regions. Twenty-seven patients with suspected carcinoma who were subsequently proved to have benign lesions had V-P abnormalities similar to those in patients with lung cancer. Thus, no pattern of V-P abnormalities allowed lung cancer in this screened population to be reliably distinguished from coexisting airway disease or nonmalignant pulmonary masses. V-P lung studies have a limited role in the early detection of lung cancer. (Author abstract) (34 Refs)

MISCELLANEOUS

20. LYMPHOSCINTIGRAPHY IN MALIGNANT MELANOMA: 99MTC ANTIMONY SULFUR COLLOID.

Sullivan DC, Croker BP, Harris CC, Deery P, Seigler HF

(c/o Seigler) Dept. Surgery, Duke Univ. Medical Center, Durham, NC, 27710

AJR; 137(4):847-851 1981

Lymphoscintigrams were performed using technetium-99m antimony sulfur colloid in 21 patients with cutaneous malignant melanoma. Scintigraphic results were concordant with clinical prediction of lymph drainage in 6 of 11 patients with trunk melanoma, in 5 of 7 patients with extremity lesions, and in 0 of 3 patients with scalp melanoma. Thirteen patients showed activity in more than one regional node group. Eleven patients had focal activity in areas other than regional node groups (ie, in-transit or central lymph nodes). Lymphadenectomy was performed in 19 patients. In each case, the regional lymph node area chosen for resection was positive scintigraphically. The presence of 99mTc activity in excised lymph nodes was documented by scintillation counting and autoradiography. Metastatic disease was found in the resected nodes of 12 patients. Lymphoscintigraphy may be useful in planning lymphadenectomy in some patients with cutaneous melanoma. (Author abstract) (9 Refs)

21. USE OF 40K FOR ANALYSIS OF 'BODY COMPOSITION' IN CANCER PATIENTS.

Kaplan MA, Sloventator VIu, Khmelevskii IaM, Nekrasova IP, Shakhtarin VV
Res. Inst. Medical Radiology, Obninsk, USSR
Vestn Akad Med Nauk SSSR; (3):87 1981

Distribution of potassium radioisotope (40K)was used for the calculation of body composition (sum of the cellular and extracellular body wt) in 341 patients with various malignant neoplasms. All patients showed deficit of the cellular body wt (CBW). The decrease was the most pronounced in the patients with laryngeal, esophageal, rectal, and lung carcinoma and osteogenic sarcoma. The decrease of the extracellular body wt (EBW) was the most pronounced in the patients with esophageal, stomach, tongue, rectal, laryngeal, thyroid, and bladder carcinoma, and osteogenic sarcoma. The decrease of CBW was associated with systemic effect of tumor on protein metabolism, while deficit of EBW was caused by disturbances of lipid metabolism. (17 Refs) (In RUS)

SELECTED PRE-CLINICAL STUDIES

22. LOCALIZATION OF MAMMARY TUMORS IN VIVO WITH 131I-LABELED FAB FRAGMENTS OF ANTIBODIES AGAINST MOUSE MAMMARY EPITHELIAL (MME) ANTIGENS.

Wilbanks T, Peterson JA, Miller S, Kaufman L, Ortendahl D, Ceriani RL
(c/o Peterson) Bruce Lyon Memorial Res. Lab., Children's Hosp. Medical Center, 51st and Grove St., Oakland, CA, 94609
Cancer; 48(8):1768-1775 1981

The Fab fragments of antibodies against cell-type-specific surface antigens of mouse mammary epithelial cells (MME-antigens) were used to localize mammary tumors successfully. The radioiodine-labeled anti-MME (Fab) was injected into mice carrying simulated mammary metastases, and after 24 hr the amounts of label per gram of excised tissue was several times greater in the tumor than in liver, brain, lung, or muscle. Kidney showed considerable accumulation of label but this appeared to be nonspecific. Kinetic studies revealed a rapid elimination of labeled Fab in the urine with only 1% of the injected dose remaining in the entire blood pool after 24 hr. With a high-purity germanium camera, mammary tumors were clearly located by the 131I-labeled anti-MME (Fab), and normalization to 99mTc-pertechnetate distribution in the animal increased the specificity. The density of 131I-label was fourfold greater over the mammary tumor than over comparable areas of the mouse. No accumulation of 131I-anti-MME (Fab) was observed in nonmammary tumors nor in mammary tumors when labeled nonspecific Fab was used. An analogous system using an anti-human mammary epithelial antiserum is being developed for localization of breast metastases in humans. (Author abstract) (40 Refs)

23. EFFECTS OF SINGLE-DOSE IRRADIATION ON TUMOR BLOOD FLOW STUDIED BY 15O DECAY AFTER PHOTON ACTIVATION IN SITU.

Emami B, Haken RK, Nussbaum GH, Hughes WL
Div. Radiation Oncology, Mallinckrodt Inst. Radiology, Washington Univ. Sch. Medicine, 510 S. Kingshighway, St. Louis, MO, 63110
Radiology; 141(1):207-209 1981

A noninvasive technique employing photon activation of tissue oxygen in situ and detection of subsequent 15O positron decay was used to study the effects of single-dose 60Co irradiation on capillary blood flow in transplanted rat rhabdomyosarcomas. Tumor blood flow was measured before irradiation with 16.5, 38.5, or 60.5 Gy and at several intervals afterward (0-72 hr). Pre-irradiation values of vol-av blood flow in the tumor ranged from 7 to 44 ml/min/100 g. Several hr after irradiation, blood flow fell by up to 50% for 60.5 Gy and up to 35% for 16.5 Gy. However, 24 hr after irradiation, tumor blood flow had recovered completely in the 16.5-Gy group and substantially in the others. For smaller doses such as the fractions typically employed in radiotherapy, no changes in tumor blood flow were observed. (Author abstract) (10 Refs)

24. MEASUREMENT OF BLOOD FLOW AND VASCULAR PERMEABILITY CHANGES IN RESPONSE TO 12-O-TETRADECANOYL-PHORBOL-13-ACETATE AND TO ASBESTOS FIBERS.

Hamilton JA, VadasP, Hay JB
Memorial Sloan-Kettering Cancer Center, 1275 York Ave., New York, NY, 10021
J Toxicol Environ Health; 8(1/2):205-214 1981

The effects of topically applied 12-O-tetradecanoyl-phorbol-13-acetate (TPA), ph orbol and suspended asbestos fibers on hyperemia and vascular permeability was determined in shaved skin of albino rabbits. After insertion of an intracardiac catheter, blood flow was measured by injection of 57Co-labeled microspheres and determining radioactivity in skin of the back 2 min after injection. Increased vascular permeability was determined in the same lesion after injection of Evans blue and 125I-labeled human serum albumin. TPA, but not phorbol, resulted in hyperemia. Topical application of dexamethasone (DEX) and indomethacin (IND) and ETYA 1 hr before TPA inhibited hyperemia. Various types of asbestos produced hyperemia but vascular permeability responses were generally not significantly different from controls. In preliminary experiments, IND and DEX partially inhibited hyperemia due to the chrysotile A form of asbestos. (36 Refs)

25. NUCLEAR MAGNETIC RESONANCE IMAGING OF THE ABNORMAL LIVE RAT AND CORRELATIONS WITH TISSUE CHARACTERISTICS.

Herfkens R, Davis P, Crooks L, Kaufman L, Price D, Miller T, Margulis AR, Watts J, Hoenninger J, Arakawa M, McRee R
(c/o Kaufman) Radiologic Imaging Lab., Univ. California, 400 Grandview Drive, San Francisco, CA, 94080
Radiology; 141(1):211-218 1981

Nuclear magnetic resonance (NMR) images of live rats with sterile and pyogenic abscesses, hematomas, and various implanted and spontaneous neoplasms demonstrated good contrast differentiation between pathologic and surrounding normal tissues. This differentiation was max when both the T1 and T2 tissue relaxation times were used as criteria. Neoplasms have a broad range of T1 and T2 values and may be confused with abscesses or hematomas. Tissue rate constants (1/T1 and 1/T2) are mainly dependent on total water content, the exception being fat, which has a 1/T2 value much shorter than that expected on the basis of water content alone. (Author abstract) (19 Refs)

26. DETECTABILITY OF HEPATOMAS IN RAT LIVERS BY NUCLEAR MAGNETIC RESONANCE IMAGING.

Davis PL, Kaufman L, Crooks LE, Miller TR
Radiologic Imaging Lab., Univ. California San Francisco, 400 Grandview Dr., So. San Francisco, CA, 94080
Invest Radiol; 16(5):354-359 1981

NMR imaging of rats with implanted hepatomas in the liver demonstrates that under the imaging conditions of this study tumors of over 8 mm2 in area can be detected with high accuracy. Compared to normal liver, approx 70% of these tumors had a combination of relaxation times (T1-T2) that could be uniquely identified as tumors, while the other 30% demonstrated relaxation time combinations that overlapped those previously found for abscesses, brain, and hematomas. (Author abstract) (9 Refs)

REVIEWS

27. THE CURRENT STATUS OF SCINTIGRAPHY IN ONCOLOGY.

Fereberger W, Leb G, Goeiel R, Samonigg H, Robier FP
Medizinische Universitatsklinik, Auenbruggerplatz 15, A-8036 Gratz, Austria
Acta Med Austriaca; 8(3):88-92 1981

Diagnostic methods serve three purposes: (1) screening, (2) determination of tumor growth and staging, and (3) monitoring of therapy. The status of scintigraphy in each of these areas is reviewed on the basis of clinical observations and literature. Scintigraphy is a primary diagnostic tool, supported by histologic and cytologic studies, primarily in cases of thyroid enlargement. Results with other tumor types, such as mammary carcinoma, female genital carcinomas, and gastrointestinal tumors are not conclusive. Non-invasive scintigraphy using 76Ga-citrate is an important method of measuring the progress and staging of Hodgkin's disease. Scintigraphy using 99mTc-phosphates is similarly important in evaluating tumors that tend to produce early bone metastases. As a follow-up to chemo- or radiotherapy, positive scintigraphic are a reliable indicator of continued tumor presence. Negative findings, however, cannot be taken as conclusive evidence of a cure. (27 Refs) (In GER)

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BREAST NEOPLASMS

1. ROLE OF BONE SCANS IN THE INITIAL ASSESSMENT OF OPERABLE PATIENTS WITH BREAST CARCINOMA.

Strender LE, Lagergren C, Wallgren A, Liljevall S
Radiumhemmet, Karolinska Sjukhuset, S-104 01 Stockholm, Sweden
Acta Radiol Oncol Radiat Phys Biol; 20(3):187-191 1981

The yield and the prognostic significance of initially performed bone scintigraphy in 387 patients with operable mammary carcinoma are reported. The mean follow-up time was 52 mo. In 1 2 patients (3.1%) the scintigraphy was considered to indicate bone metastases but it only 3 of these bone metastases later developed. The low information obtained has resulted in exclusion of bone scintigraphy in the initial assessment of clinically operable patients with mammary carcinoma. (Author abstract) (19 Refs)

2. ROLE OF COMPUTERISED BONE SCANNING IN ADVANCED BREAST CANCER (MEETING ABSTRACT).

Parbhoo SP, Alani H, Stoll BA, Agnew J, Varghese Z
Department of Surgery, Royal Free Hospital, London, England
Twelfth International Congress of Chemotherapy, July 19-24, 1981, Florence, Italy. The International Society of Chemotherapy 301 pp., 1981.

Bone scans using Technetium 99m Methylene Diphosphonate have been carried out in 84 patients with advanced breast cancer. Serial studies at intervals of 4 wk to 6 mo have been carried out in 38 of these patients shown to have metastases. The metastases have been quantitated using a region of interest (ROI) technique to obtain a metastasis to normal bone ratio. Progressive disease or recurrence has been heralded by an increase in the ROI, while response to radiotherapy, endocrine manipulation, endocrine ablation or cytotoxics has been shown by a decrease in the ROI. These results have been collaborated by subsequent clinical response and radiological changes. Current studies include correlation with serial urinary hydroxyproline/creatine ratios. The preliminary results of this technique has allowed us to modify treatment at an early stage according to the serial change. (no Refs)

3. RESULTS OF A COMBINED RADIOGRAPHIC-SCINTIGRAPHICAL STUDY FOR DETECTING BONE METASTASES IN BREAST CANCER (MEETING ABSTRACT).

Iapad M, Arzano S, Buzzi F
No affiliation given
Eur J Nucl Med; 6:85 1981

The authors report their assessment of the utility and limitations of total-body bone scintigraphy and of radiological examination in the early diagnosis of bone metastases in patients with histologically documented breast cancer. Ninety-two patients between 29 and 79 yr old, who came to the Oncological Department of our Hospital were examined. Using the tumor, node, metastases system, the breast cancer were classified as Stage (St) I in 10 patients, II in 54, III in 11, IV in 7, Non-Defined St in 10 patients. As of Nov '80, 64 were free of bone metastases (true negative) while 28 were affected (true positive) and distributed as follows: St I: 1/10 (10%); St II: 11/54 (20%); St. III: 4/11 (36%); St IV: 6/7 (86%); Non-Defined St : 6/10 (60%). These percentages were considered as the effective disease incidence for the various stages. The following ratios were calculated: Sensitivity (Rx46%, Sc 71%); Specificity (Rx98%, Sc94%); Accuracy (Rx85%, Sc88%); Predictive Value of positive or negative radiographic and scintigraphical responses in St I , II and III. The statistical significance of the results is under study. (no Refs)

4. BREAST SCINTIGRAPHY AS AN IMAGING MODALITY IN THE DIAGNOSIS OF BREAST MASSES.

Cancroft E, Goldfarb CR
Dept. Radiology, Nassau County Medical Center, East Meadow, NY, 11554
Semin Nucl Med; 11(4):289-300 1981

The early detection and presurgical diagnosis of breast masses remains a formidable challenge. Recent technologic advances have permitted additional noninvasive means of evaluating the breast in conjunction with physical examination and mammography. We have employed 99mTc-pertechnetate breast scanning in selected cases as a complement to mammography when the diagnosis was uncertain. In such cases, the combined use increased the diagnostic accuracy. (Author abstract) (32 Refs)

CENTRAL NERVOUS SYSTEM NEOPLASMS

5. PRELIMINARY RESULTS OF INTRACAVITARY IRRADIATION OF CYSTIC CRANIOPHARYNGIOMAS BY MEANS OF STEREOTACTICALLY APPLIED YTTRIUM-90.

Sturm V, Rommel T, Strauss L, Georgi P, Scheer KE, Steude U, Stock G, Penzholz H, Backlund EO
No affiliation given
Adv Neurosurg; (9):401-404 1981

Treatment of 10 cystic patients with craniopharyngiomas by intracavity high energy beta-irradiation of the cyst wall is described. Following stereotactic puncture of the center of the cyst, 1-2 ml of craniopharyngioma fluid was aspirated and replaced by Technetium-99 soln to determine the exact vol of the cyst. The amount of colloidal yttrium-90 necessary to irradiate every point of the inner surface of the cyst with 20,000 rad was injected into the cyst. The yttrium-90 instillation caused an arrest in the growth of 8/9 cysts in one group of patients. In the single patient in the second group, another small cyst developed from the tumor matrix 10 mo after treatment of the first cyst. (11 Refs)

6. VALUE OF MYELOSCINTIGRAPHY IN THE DIAGNOSIS OF SPINAL CANAL PATENCY.

Chmielowski K, Lachowski M, Rudnicki S, Jaszczuk E
Zaklad Medycyny Nuklearnej, Kliniczny Oddzial Izotopowy Centrum Kztalcenia Podyplomowego WAM, ul. Szaserow 128, 00-909 Warszawa 60, Poland
Neurol Neurochir Pol; 15(2):173-180 1981

Results of 66 myeloscintigraphies in 66 patients suspected of having compression lesions of the spinal cord agreed with results of 32 contrast myelographies carried out in 38 patients and in 22 cases these results were confirmed by operation. In the remaining cases contrast myelography was abandoned in view of the unequivocal results of myeloscintigraphy, and conservative treatment was begun. Myeloscintigraphy makes possible diagnosis of spinal tumors, arachnoidal adhesions and meningocele. (20 Refs) (In POL)

DIGESTIVE NEOPLASMS

7. MICROSPHERE ANGIOGRAPHY IN HEPATIC ARTERY INFUSION FOR CANCER.

Rodari A, Bonfanti G, Garbagnati F, Marolda R, Milella M, Buraggi GL
Instituto Nazionale Tumori, Via Venezian 1, I-20133 Milan, Italy
Eur J Nucl Med; 6(10):473-476 1981

Human albumin microspheres labeled with 99technetium were used for the evaluation of drug distribution and for the imaging of neoplastic lesions before ia treatment of liver cancers in 24 patients. Of the 24 patients, 23 had primary or metastatic liver cancer and one with high carcinoembryonic antigen levels 2 yr after gastroresection was found free of hepatic involvement. In 13/22 cases, microsphere distribution differed significantly from that observed in contrast angiography. In 3/13 cases, the difference was important enough to necessitate catheter replacement. In one, a patient with primary liver cancer confined to the right lobe, contrast angiography demonstrated injection of the common hepatic artery and its branches, while slowly injected microspheres were exclusively trapped by the spleen. In one of two patients, in whom contrast angiography was impossible due to stenosis of the surgically placed catheter, microsphere examination revealed predominant distribution to stomach and duodenum. In this series of 24 patients, liver uptake of radiolabeled microspheres was greater than 75% in 16 cases, 25-50% in 4 cases, and less than 25% in 4 cases. There was a microsphere distribution pattern showing neoplastic lesions as hot areas in 12/20 patients. Only in one case was the region of neoplastic involvement cold in microsphere examination. Microsphere examination allowed an easy evaluation of the relative perfusion of the liver and of the intrahepatic distribution of arterial blood flow in all patients. (5 Refs)

8. DIAGNOSTIC VALUE OF TRANSVERSE AXIAL TOMOSCINTIGRAPHY FOR THE DETECTION OF HEPATIC METASTASES: RESULTS ON 53 EXAMINATIONS AND COMPARISON WITH OTHER DIAGNOSTIC TECHNIQUES.

Berche C, Aubry F, Langlais C, Vitaux J, Parmentier C, Di Paola R
Service des Isotopes, Institut Gustave-Roussy, Rue Camille Desmoulins, F-94800 Villejuif, France
Eur J Nucl Med; 6(10):435-452 1981

The diagnostic potentialities of tomoscintigraphy (TS) for detecting hepatic metastases were studied. Several kinds of new qualitative results (transverse and nontransverse plane sections and three-dimensional (3-D) views) were obtained. These results are compared with those of other technics to estimate their clinical value. Fifty-three TS were performed on 48 patients (46 adults (21 men, 25 females), 21-81 yr old and 2 children, 8 and 9 yr old). In important malignant diseases, all the qualitative technics (surgery, echography, scintigraphy, and TS) were equivalent. In intermediate malignant diseases, TS maintained a high diagnostic interest, whereas echography and scintigraphy lost almost all interest. The biological hepatic tests (SGOT, SGPT, gamma-glutamyl transpeptidase, and alkaline phosphatase) had a very low efficiency and carcino-embryonic antigen occupied an intermediate position between the qualitative technics and the biological tests. In this series of patients, TS ranked among the best of the exploration technics of the liver without excessive clinical constraints: 5 min examination and 10 min computing. (22 Refs)

9. HEPATIC FOCAL NODULAR HYPERPLASIA: ANGIOGRAPHY, CT, SONOGRAPHY, AND SCINTIGRAPHY.

Rogers JV, Mack LA, Freeny PC, Johnson ML, Sones PJ
(c/o Mack) Dept. Radiology, ZA-65, Harborview Medical Center, Seattle, WA, 98104
AJR; 137(5):983-990 1981

Eleven patients with focal nodular hyperplasia of the liver underwent a combination of radiologic procedures, including sonography, computed tomography (CT), hepatic scintigraphy, and angiography. This paper describes the radiologic findings in this group of patients and reviews the current literature. In the present series, sonography was the most sensitive (100%) method for detection of focal nodular hyperplasia, while CT was able to detect only seven (78%) of nine cases. Arteriographic findings were felt to be characteristic in 9 (82%) of 11 cases. Hepatic scintigraphy demonstrated normal colloid uptake in 6 (55%) of 11 lesions. In this series, an accurate radiologic diagnosis of focal nodular hyperplasia was made in 73% of cases. Hepatic scintigraphy is the pivotal examination. Normal colloid uptake by a focal hepatic mass is virtually diagnostic. However, in the patients in whom the colloid scan shows decreased or absent uptake, angiography may show findings diagnostic of focal nodular hyperplasia in up to 75% of cases, thus avoiding the need for liver biopsy or surgery. (Author abstract) (52 Refs)

10. LIVER SCANS IN EVALUATION OF LESIONS OF THE DIAPHRAGM.

Levinson ED, Spencer RP, Roswig DM, Sayre J
Dept. Radiology, Univ. Connecticut Health Center, Farmington, CT, 06032
Clin Nucl Med; 6(11):525-527 1981

Three patients had chest radiographs suggesting pathology associated with the right hemidiaphragm. The patients' histories included trauma in one case, recently diagnosed leukemia in a second, and Hodgkin's disease in the third. In all three cases, the Tc-99m-sulfur colloid liver scan provided a noninvasive identification of the nature of the diaphragmatic densities seen on the chest radiographs, thus affecting patient management. (Author abstract) (4 Refs)

11. TUMOR RELATED GASTROPARESIS: CORRECTION WITH METOCLOPRAMIDE (MEETING ABSTRACT).

Shivshanker K, Bennetts RW, Haynie TP
M. D. Anderson Hospital and Tumor Institute, Houston, TX, 77030
Gastroenterology; 80(5,part2):1283 1981

Extensive upper gastrointestinal (GI) tumors seem to have a special predilection to develop a syndrome suggestive of gastroparesis. They complain of early satiety, post prandial fulln ess, nausea and vomiting in the absence of an anatomical cause being delineated. Aim: 1) To determine the frequency of this syndrome in GI tumors. 2) To evaluate the efficacy of metoclopramide in correction of gastric stasis in tumor patients. Ten patients were studied: gastric cancer 3; pancreatic cancer 6; gall bladder cancer 1. All medications were discontinued for 48 hr prior to study. Every patient underwent a gastric emptying study using a radioisotopic method using technetium-labeled diethylene triamine pentaacetic acid as a marker. Metoclopramide 10 mgm qid was administered. Patients demonstrating improvement continued on Metoclopramide for a period of 3 mo. All 10 patients demonstrated subjective improvement as quantified by changes in symptom score. Control of nausea was the main benefit in patients whose SS improved by less than 10

points. Significant delay in gastric emptying was documented in 6 patients with initial SS greater than 20. In 5 of these patients SS improved by greater than 10 with simultaneous significant improvement in gastric emptying. These patients had long term symptom palliation and wt gain. All 10 had tumor progression despite chemotherapy. Tumor associated gastroparesis is more common than appreciated. It can be seen with pancreatic cancer without anatomical invasion of the stomach or causing obstruction. Metoclopramide is helpful in the palliative care of GI tumor patients. (no Refs)

12. ROLE OF CEA RADIOIMMUNODETECTION IN THE MANAGEMENT OF COLORECTAL CANCER (MEETING ABSTRACT).

Goldenberg DM, Kim EE, Deland FH, Bennett SJ
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Oncodev Biol Med; AbstractsBook,1:P62 1981

Radioactive antibodies to carcinoembryonic antigen (CEA) have been shown to detect and locate CEA-producing tumors in man by the method of radioimmunodetection. Although this method is still rapidly developing and improving, clinical advantages have been attained in a number of patients in whom tumor recurrence or metastasis was suspected. Over 52 patients with a history of confirmed colorectal cancer received an iv injection of between 1 and 2.5 mCi of 131-I-labeled, affinity-purified, goat antibody IgG against CEA, followed by total-body photoscanning. Blood-pool and non-target sites or radioactivity were reduced by subtracting the images derived by injection of 99m-technetium components from the 131-I scans. In 10 of the 52 patients, sites of occult cancer could be located and then confirmed by surgery or other methods when, prior to radioimmunodetection, standard detection measures failed to reveal these sites. Elevated CEA plasma levels did not hinder successful tumor detection. It is concluded that cancer radioimmunodetection with highly purified antibodies to CEA is a useful procedure for pre- and post-operat ive evaluation of patients with CEA-producing colorectal cancer, sometimes revealing sites of tumor not disclosed by other procedures. (no Refs)

13. LOCALIZATION OF EARLY RECURRENCE OF CARCINOMA OF THE COLON OR RECTUM BY RADIOIMMUNODETECTION IN PATIENTS WITH A RISING SERUM CARCINOEMBRYONIC ANTIGEN CONCENTRATION (MEETING ABSTRACT).

Begent RH, Keep PA, Searle F, Dent J, Bagshawe KD, Jones BE, Jewkes RF, Vernon P
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Oncodev Biol Med; AbstractsBook,1:P62 1981

Radioimmunodetection (RID) for localization of carcinoma of the colon or rectum by external scintigraphy after injection of 131 Iodine labelled antibody to carcinoembryonic antigen (CEA) has been reported. The purpose of this study was to investigate whether the method could be used to localize recurrence of carcinoma of the colon and rectum which have been predicted by rises in concentration of serum CEA during follow-up after apparently curative resection. RID was performed using the method of Goldenberg in 10 patients with raised serum CEA in the absence of symptoms or physical signs of recurrence. RID was positive in 9, the sites being liver alone, 3; liver and para-aortic nodes, 1; liver and retrovesical area, 1; liver and colon, 1; perineum, 1; bone, 1; para-colic area, 1. These recurrences have been confirmed unequivocally in 4 patients. While recurrence is likely in the remaining 5 patients it has not been definitely demonstrated by conventional radiology or surgery. These preliminary data suggest that RID may be useful in the investigation of patients in whom subclinical recurrence of carcinoma of the colon or rectum is suspected. In its present form it can be used to indicate which sites of suspected recurrence should be further investigated. (1 Ref)

14. USE AND LIMITATIONS OF 131I-LABELED MONOCLONAL ANTI-CEA ANTIBODIES FOR SCANNING DETECTION OF HUMAN CARCINOMAS (MEETING ABSTRACT).

Mach JP, Buchegger F, Forni M, Ritschard F, Accolla R, Carrel S
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Oncodev Biol Med; AbstractsBook,1:29 1981

Monoclonal antibodies with a high specificity and affinity for carcinoembryonic antigens (CEA) were purified from hybridoma ascites, labeled with 131I and injected first in nude mice bearing human carcinoma grafts and later in tumor bearing patients. The results from the pilot human studies, obtained by external scanning of the patients and by direct measurement of the radioactivity in resected tumors and adjacent normal tissues, showed that monoclonal anti-CEA antibodies are capable of specific tumor localization in some patients. Ten out of 20 patients with colon or pancreas carcinoma injected with labeled monoclonal antibodies showed positive 'immuno-scintigraphy'. The specificity indices of localization obtained by comparing in fragments of tumor and normal tissues, the 131I radioactivity of the antibodies with the 125I radioactivity of control normal mouse IgG injected simultaneously with the antibodies, gave values ranging from 2-6. The non-specific accumulation of antibody radioactivity in the reticuloendothelium was much lower than with polyclonal antibodies. (2 Refs)

15. DIAGNOSIS OF LOCALIZED HEPATOMA BY ANTI-ALPHA-FETOPROTEIN (AFP) LABELED WITH RADIOACTIVE I131 (MEETING ABSTRACT).

Ishii N, Nakada K, Muro T, Kohno K, Furukawa R, Munehisa T, Nagataki S, Koji T, Hirai H
First Dept. Internal Medicine, Nagasaki Univ., Sch. Medicine, Sakamoto-cho, Nagasaki 852, Japan
Proceedings of the 17th Annual Meeting of Japan Society of Hepatology held in Gifu, Japan, 25-26 June, 1981. Japan Society of Hepatology, Tokyo 113, Japan, 148 pp., 1981.

I131-anti-human-AFP horse-specific antibody (1.0-1.7 mCi, specific radioactivity about 10 mCi/mg) was injected iv into nine patients who had hepatoma confirmed by such procedures as angiography and had high concentrations of AFP in their serum (209-57,000 ng/ml). Hepatic scintigrams were obtained 24 and 48 hr after the injection. To eliminate the effect of the radioactive isotope distributed in the blood, TC-99m human albumin was injected iv before the scintigraphy was performed, and the image of the TC-99m was eliminated from the image produced by the I131 antihuman AFP antibody by computer. Positive findings were obtained in the scintigrams at 24 and 48 hr for four of the nine patients with hepatoma. Three of these patients had relatively large localized tumors and the other had small hepatoma. There was no correlation between the size of the tumor or concentration of AFP in the serum before the antibody was administered and the positive findings. The tumors in two of the nine patients could be extirpated after scintigraphy. The half-life of the radioactive antibody in blood samples obtained periodically after injection of the labeled antibody was measured and the radioactive isotope in the blood

was fractionated by Sephadex G-150 column chromatography. The half-life of the antibody administered was about 4.6 days. Two peaks thought to be the complex and free IgG were detected by column chromatography in the radioactive I fraction in the blood although the concentration of AFP in the blood was relatively high. (no Refs) (In JPN)

ENDOCRINE NEOPLASMS

16. CLINICAL EVALUATION OF 67GA SCANNING IN THE DIAGNOSIS OF ANAPLASTIC CARCINOMA AND MALIGNANT LYMPHOMA OF THE THYROID.

Higashi T, Ito K, Mimura T, Ohi T, Nishikawa Y, Wilcox JR
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Radiology; 141(2):491-497 1981

While 67Ga uptake has been reported to be highly variable and nonspecific in the diagnosis of malignant tumors of the thyroid, it has also been observed to depend on the histological nature of the lesion. For this reason, the behavior of 67Ga in various types of thyroid cancer was investigated in a prospective study of 86 patients with thyroid masses compatible with anaplastic carcinoma or malignant lymphoma. The study demonstrated a distinct difference in uptake between well-differentiated adenocarcinoma of the thyroid and the more undifferentiated anaplastic carcinoma and malignant lymphoma. (Author abstract) (15 Refs)

17. ROLE OF 131CS SCAN IN PREOPERATIVE DIAGNOSIS OF NONFUNCTIONING THYROID NODULES.

Madeddu G, Casu AR, Tanda F, Costanza C, Dettori G, Arras ML, Langer M
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Am Surg; 47(11):479-482 1981

The role of 131Cs scan in the preoperative diagnosis of cancer was evaluated in 355 patients with either cold or nonfunctioning thyroid nodules. Nodules were classified as positive, doubtful or negative by the pattern or isotope accumulation. Among 234 patients who underwent thyroidectomy, malignant lesions were found in 10.2% of cases. All carcinomas but one found during surgery had been classified as positive by radiocesium scan and were considered as highly suspicious preoperatively; one carcinoma and two papillary adenomas had been classified doubtful and considered presumably malignant. False-positive nodules were found. However, we did not document histologically malignant lesions in nodules which were classified as negative by radiocesium uptake. The routine use of 131Cs scanning may be very useful in patients with cold or nonfunctioning thyroid nodules because of its high sensitivity in excluding malignant lesions. (Author abstract) (21 Refs)

18. DEFECTIVE IODIDE TRANSPORT AND NORMAL ORGANIFICATION OF IODIDE IN COLD NODULES OF THE THYROID.

Shiroozu A, Inoue K, Nakashima T, Okamura K, Yoshinari M, Nishitani H, Omae T
(c/o Inoue) Second Dept. Internal Medicine, Faculty Medicine, Kyushu Univ., Maidashi 3-1-1, Higashi-Ku, Fukuoka City, 812, Japan
Clin Endocrinol (Oxf); 15(4):411-416 1981

Eleven thyroid follicular adenomas, cold on scintigram were analyzed to determine whether defect in iodide organification or iodide transport causes low iodide uptake in cold nodules of the thyroid. The results were compared with perinodular tissue samples used as controls. In 8 of 11 adenomas incubated in medium with 0.1 uM of iodide, newly organified iodide was 85.6 +-8.6% of total trapped iodide, which was significantly higher than 52.3 +-12.8% in controls. The remaining three adenomas showed a value as low as 4.0 +-2.7%. These data suggest that follicular adenomas are of two different groups; one with high organic iodinating activity and the other with none. these two groups were defined as FA-1 and FA-2. Thyroid:med ium ratios of iodide of both groups were significantly depressed, indicating that the essential alteration in the thyroid follicular adenoma is a disturbance of iodide transport. In contrast to controls organification of iodide was not inhibited by the addition of 100 uM iodide to the medium in FA-1 adenomas. In both FA-1 and FA-2, the degree of iodination of thyroglobulin (Tg) in equilibrium was significantly lower than that in controls. Therefore, in most cases with the follicular adenoma, the principal cause of decreased iodination of Tg was considered to be a depressed iodide transport, but not an impairment of organic iodination. (Author abstract) (18 Refs)

19. THE ROLE OF NUCLEAR MEDICINE IN THE TREATMENT OF HYPERTHYROIDISM AND WELL-DIFFERENTIATED THYROID ADENOCARCINOMA.

Maxon HR, Thomas SR, Chen IW
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Clin Nucl Med; 6(10):p87-p98 1981

Approaches to treatment of hyperthyroidism and well-differentiated thyroid adenocarcinoma are presented, with emphasis on the role of nuclear medicine. Graves' disease (GD) can be treated through drug therapy with thionamide (antithyroid) compounds, surgery, or radioiodine. Long-term thionamide therapy for GD is optimal for children and adolescents with mild hyperthyroidism and small goiter not exceeding 2x normal size. Surgery is indicated as primary treatment for GD when concomitant hyperparathyroidism or non-functional, possibly malignant, nodules are present. I-125 should be abandoned as therapy for GD; I-131 provides a convenient and effective approach to GD treatment. In hyperthyroidism due to toxic nodular goiter, surgical therapy is the treatment of choice for solitary toxic adenomas; in toxic multinodular goiters, surgery or I-131 therapy may be used. Definitions of minimal papillary carcinoma, papillary carcinoma (PC), and follicular carcinoma (FC) are presented. Patients falling into the low-risk PC group may be treated adequately with a minimum surgical procedure consisting of total lobectomy on the affected side, isthmectomy, subtotal contralateral lobectomy, and sampling of possibly involved lymph nodes. Patients with high-risk PC and any but the smallest, most benign-appearing FC should be considered for more extensive therapy including total or near total thyroidectomy and I-131 therapy. The role of I-131 in the treatment of thyroid cancer is discussed. (108 Refs)

20. DIAGNOSIS AND DIFFERENTIAL DIAGNOSIS OF THYROID CARCINOMA.

Pfannenstiel P
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MMW; 123(37):1350-1352,1364 1981

The diagnosis and differential diagnosis of thyroid carcinoma is described. Thyroid scintigraphy with 99mTc-pertechnetate or 123I can show cold nodules which occur in more than half of all nodular goiters. Although less than 5% are malignant, all cold nodules should be considered malignant until proven otherwise. The demonstration of multiple scintigraphically cold nodules strongly reduces the probability of malignant tumor. Scintigraphically warm and hot nodules are rarely malignant. Cold nodules require ultrasonography to distinguish between cysts and solid formations. Directed fine-needle biopsy is indicated in all cases of scintigraphically cold nodules and/or nodules with reduced echo in the ultrasonogram. Using the currently available diagnostic methods, surgical verification of the diagnosis is unnecessary in approx 90% of all patients with solitary thyroid nodules. (18 Refs) (In GER)

21. MEASUREMENT OF TSH DURING J-131 WHOLE BODY SURVEY (SCAN AND PBJ-131) FOR THYROID CARCINOMA (MEETING ABSTRACT).

Schaub WE
Department of Radiology, Kantonsspital Winterthur, Winterthur, Switzerland
Eur J Nucl Med; 6:A27 1981

The level of endogenous thyroid stimulating hormone is one of the factors determining the detection of I-131 concentrating tumor (local recurrence or metastases). Generally the patient interrupts the T3-or T4-substitution for a certain period and receives a higher diagnostic dose for this survey, 5 mCi I-131 in our institution. As the patient develops uncomfortable symptoms of hypothyroidism, a minimal but sufficient withdrawal of T3 or T4 is desired. In a group of 19 patients with a 8-day withdrawal of T3 the mean TSH was 30.3 (+/-23.2) uE/ml. In 27 patients with a 10 day withdrawal of T3 the mean TSH was 59.4 (+/-108.5) uE/ml. In a third group (n equals 10) T4 was withdrawn for 3 wk resulting in a mean TSH of 14.2 (+/-9.1) uE/ml. In a final fourth group (n equals 31) the T4-withdrawal for 4 wk produced a TSH of 62.3 (+/-45.0) uE/ml. Variations of the TSH-level were important in each group and the distribution wasn't a true normal one. The number of patients demonstrating a TSH was below 10. It is concluded that a withdrawal of T3 for 10 days and of T4 for 4 wk is generally necessary and sufficient for I-131-whole body survey in patients with previous differentiated thyroid carcinoma. Measurement of TSH is recommended for patients with known metastases while assessing the capability of I-131-concentration. (no Refs)

22. PREDICTIVE VALUE OF SCINTIGRAPHY, SCANNING ECHOGRAPHY AND THERMOGRAPHY IN THYROID NODULAR MALIGNANCY (MEETING ABSTRACT).

Tumiati MN
No affiliation given
Eur J Nucl Med; 6:A30 1981

With the aim of evaluating the usefulness of the combined use of Scintigraphy (Sc), Scanning echography (Ec) and Thermography (Th) as screening test for thyroid nodular malignancy, we compared results from these tests with the post-operative diagnosis derived from histological examination. The scintigraphic tests were performed with linear scanner or gamma-camera; the echographic tests with gray-s cale manual sonography, the thermographic tests with AGA-thermovision system. Those nodules, which were 'cold-solid or mixed-hot spot (greater than 1.5 C)' were predicted to be malignant. Results' analysis suggests noteworthy evaluations. Scintigraphy and echography show high sensitivity and low specificity. However specificity could be increased combining two tests. This approach shows that the test pairing can increase their predictive value in the thyroid cancer screening. Thermography shows higher specificity but lower sensitivity and makes unacceptable the predictive value (Vb) of other tests, when associated with it. (no Refs)

23. EVALUATION OF SOLITARY 'COLD' THYROID NODULE WITH TC-99M PERTECHNETATE DYNAMIC PERFUSION STUDY (MEETING ABSTRACT).

Yang DC, Giovanniello J
The Methodist Hospital, 506 Sixth Street, Brooklyn, NY
Second Annual Meeting of the Society of Nuclear Medicine Eastern Great Lakes Chapter, May 15, 1981, Niagara-on-the-Lake, Ontario, Canada. The Society 16 pp., 1981.

Sixty-one cases of solitary cold thyroid nodules, including 27 cases of thyroid malignancy and 34 cases of benign lesions, were reviewed postoperatively to evaluate the usefulness of Tc-99m pertechnetate dynamic perfusion study in diagnosing thyroid malignancy. After the radioiodine (either I-131 or I-123) scan showed solitary cold thyroid nodule, 5 to 10 mCi of Tc-99m pertechnetate was given iv, and three one min dynamic perfusion images were obtained immediately, followed by one static thyroid image with 300K counts or 1000K counts (life size microdot image) taken about 30 min later, to determine the vascularity of the nodules. Thirteen out of 27 (48%) vascularized nodules were carcinoma, 7 (26%) were adenomatous nodular hyperplasia. Twelve out of 34 (34%) non-vascularized nodules were carcinoma, 19 (57%) were involutional nodules degenerative change. One was thyroiditis, and 8 were adenoma with degenerative change. The results showed that 48% of vascularized solitary cold nodules were malignant as compared to an av malignancy rate of about 25% in solitary cold nodules on the whole. On the basis of these results, Tc-99m pertechnetate dynamic perfusion study is helpful in selecting cases for surgical removal of thyroid nodules. Vascularized solitary cold nodules have much higher risk of malignancy and surgical removal is indicated. For non-vascularized solitary cold nodules, further evaluation with sonogram, and/or needle biopsy or aspiration, and clinical correlations are recommended. (no Refs)

24. THYROID SCANNING: SELECTED ASPECTS (MEETING ABSTRACT).

Taylor A
No affiliation given
Body Imaging: Sixth Annual International Conference, October 10-18, 1981, Maui Hawaii International Body Imaging Conference; 1981

Indications for a thyroid scan include: (1) The neck mass or thyroid nodule scan used to determine the functional capacity of the nodule. Iodine is generally preferred to pertechneatate because some thyroid cancers will accumulate pertechnetate resulting in a warm or hot nodule. In one study, 18 of 58 patients studied with both pertechnetate and iodine had a discordant scan (warm or hot with pertechnetate and cold with iodine). Of these 18, 14 proved to thyroid cancer. (2) The hyperthyroidism scan may be used to distinguish Graves (homogeneous uptake), Plummer's (toxic nodule), toxic multinodular goiter (multiple hot nodules), and facticious hyperthyroidism

(no uptake). (3) I-131 is usually preferred in the substernal mass or widened medistinum. Tc-99m pertechnetate, I-131, and I-123 are all secreted in breast milk. Unless absolutely indicated, scans should be avoided in nursing mothers. The fetal thyroid is not able to concentrate iodine until the twelfth wk of gestation. Prior to this time the radiation dose in minimal, 1 mrad/uCi of I-131 ingested by the mother. (3 Refs)

25. COMPARATIVE STUDY OF TI-201 AND I-131 SCINTIGRAPHY IN POSTOPERATIVE METASTATIC THYROID CARCINOMA (MEETING ABSTRACT).

Varma VM, Reba RC
George Washington University Hospital, Washington, DC
28th Annual Meeting of the Society of Nuclear Medicine, June 16-19, 1981, Las Vegas, Nevada The Society; 1981

Ten patients with metastatic papillary and follicular carcinoma were scanned with TI-201 and I-131. All patients had prior near total thyroidectomy and 7 had received I-131 ablation therapy. The status of the patients at the time of the study was hypothyroid with documented endogenous thyroid stimulating hormone stimulation 8; euthyroid with functioning metastasis 1; euthyroid with small residual left lobe 1. I-131 concentration was seen in 7 patients with cervical lymph node metastasis. Among these TI-201 concentration was present only in 4 patients with palpable cervical lymph nodes. In 1 patient with a cervical mass (metastatic well differentiate papillary cancer with anaplastic changes) TI-201 concentration was present with no I-131 concentration. In 3 patients with metastatic deposits seen on chest x-ray both I-131 and TI-201 concentration was present. Four patients with I-131 pulmonary concentration both chest x-ray and TI-201 scans were normal. In our series TI-201 concentration was seen only in patients with palpable metastatic lymph nodes or positive chest x-ray whereas I-131 concentration was present in all palpable as well as nonpalpable lymph node metastases and early lung metastases when chest x-ray is usually normal. TI-201 scintigraphy is useful only in patients with advanced metastatic thyroid carcinoma and does not replace I-131 scintigraphy in follow-up of these patients. (no Refs)

26. A SCREENING TEST TO IDENTIFY ALDOSTERONE-PRODUCING ADENOMA BY MEASURING PLASMA RENIN ACTIVITY: RESULTS IN HYPERTENSIVE PATIENTS.

Hiramatsu K, Yamada T, Yukimura Y, Komiya I, Ichikawa K, Ishihara M, Nagata H, Izumiyama T
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Arch Intern Med; 141(12):1589-1593 1981

In an attempt to devise a screening test for aldosterone-producing adenoma (APA) among hypertensive patients, the serum sodium and potassium levels, plasma renin activity (PRA), plasma aldosterone concentration, and aldosterone-PRA ratio were measured in 348 patients with hypertension. Nine patients with a substantially elevated aldosterone-PRA ratio were selected and hospitalized for further investigations. All nine patients were then recognized by scintigraphy with labeled cholesterol, venography, and surgical excision as having APA. The serum concentration of potassium was subnormal in three of nine patients with APA. In patients with APA, administration of diuretics and salt restriction significantly elevated PRA. However, even under notable diurnal and day-to-day variations of plasma aldosterone concentrations, the aldosterone-PRA ratio was always elevated inappropriately (more than 400) in patients with APA. In contrast, after administration of diuretics, both the PRA and aldosterone levels increased significantly in patients with essential hypertension, but the aldosterone-PRA ratio was less than 200. Since the renin-angiotensin system seems to be a major factor controlling aldosterone secretion in normal subjects, it is suggested that an elevation of aldosterone-PRA ratio more than 400 is a useful screening tool for the prediction of APA among hypertensive patients. (Author abstract) (25 Refs)

27. COMPARISON OF DIAGNOSTIC VALUE OF SCINTIGRAPHY, PHLEBOGRAPHY AND COMPUTER TOMOGRAPHY IN THE EVALUATION OF PATIENTS WITH PRIMARY ALDOSTERONISM (MEETING ABSTRACT).

Jakubowzki W, Feltynowski T, Graban W, Pacho R, Pruszynski B
No affiliation given
Eur J Nucl Med; 6:89 1981

In 50 patients with clinical and biochemical features of primary aldosteronism were done scintigraphic examinations (SC) of adrenal glands. Thirty-two patients of this group had done together with SC phlebography (PH) and computer tomography (CT) examinations. SC and CT in all cases can show the adrenal with the adenoma. PH in 10 cases was unsuccessful and could not show morphological changes in adrenal cortex. Nineteen patients were operated and diagnosis of adenoma was confirmed. The diameter of tumors varied from 8mm to 44mm. Results of operation were concordant with CT in all cases and in 18 SC examinations. The smallest adenoma revealed by CT and SC measured 8mm. The only adenoma not seen on adrenal scan measured 15mm. On the basis of our experiences we think that when SC and CT are in agreement in the localization of adrenal adenoma is not neccessary to do phlebography. (no Refs)

28. ANGIOSCINTIGRAPHY IN DETECTION OF A PHEOCHROMOCYTOMA (MEETING ABSTRACT).

Jakubowski W, Feltynowski T, Graban W, Napiorkowska E
No affiliation given
Eur J Nucl Med; 6:88 1981

Radionuclide angioscintigraphy using the bolus technique was applied in the visualization of a pheochromocytoma in 10 patients with clinical and biochemical symptoms of adrenal medulla tumors. Pheochromocytomas are frequently well vascularized tumors. When high vascular pheochromocytomas have a diameter bigger than 2 cm, it is often possible to visualize the blood supply of such tumors. In all cases diagnosis of pheochromocytoma was confirmed by angiography, computed tomography, ultrasonography and operation. In 9 of 10 cases it was possible to show the blood supply of tumors during angioscintigraphic examinations (in 8 cases in the typical places in adrenal medulla and in 1 case in the region of abdominal aorta bifurcation). Because angioscintigraphy is a very simple, fast and without risk to the patients we propose to use this technique as a screening examination in the diagnosis of patients with a pheochromocytoma. (no Refs)

GENITOURINARY NEOPLASMS

29. CURRENT STATUS OF RADIONUCLIDE SCROTAL IMAGING.

Holder LE, Melloul M, Chen D
Dept. Nuclear Medicine, Union Memorial Hosp., 201 East University Parkway, Baltimore, MD, 21218
Semin Nucl Med; 11(4):232-249 1981

Scrotal imaging with technetium-99m sodium pertechnetate consists of a radionuclide angiogram and static scrotal scans. Utilization of this study in patients presenting with an acute scrotum can dramatically reduce the number of surgical explorations for acute epididymitis. It can also aid in other aspects of differential diagnosis in patients presenting with either an acutely enlarged and/or painful scrotum or a scrotal mass. Ambiguities in previous descriptions of perfusion through the spermatic and extraspermatic cord vessels are described and distinguished from scrotal perfusion. The clinical and scintigraphic spectrum of testicular torsion, including spontaneous detorsion, early acute testicular torsion, midphase testicular torsion, and late phase or 'missed testicular torsion,' is discussed and illustrated. The variety of patterns seen in acute epididymitis, including lateral and medial epididymal location, and focal epididymitis are described, as is the appearance of hydrocele as both a primary and secondary entity. The relationship of scrotal imaging to the overall clinical presentation and evaluation of these patients is emphasized in testicular torsion, torsion of the testicular appendages, epididymitis, abscess, trauma, tumor, spermatocele, and varicocele. The techniques, clinical utility, and relationship to radionuclide imaging of Doppler ultrasound and gray scale ultrasound scanning are reviewed. Doppler ultrasound results in many false negative studies in testicular torsion. Gray scale ultrasound is useful in clarifying the nature of scrotal masses. (Author abstract) (65 Refs)

30. RADIONUCLIDE ANGIOGRAPHY (RNA) WITH 99MTC-DTPA TO EVALUATE PALLIATIVE EMBOLIZATION OF RENAL-CELL CARCINOMA.

Moser E, Marx FJ, Gebauer A, Bull U
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ROEFO; 135(3):267-274 1981

Fourteen patients with renal-cell carcinoma, who were not amenable to nephrectomy, were subjected to palliative transfemoral embolization with butyl acrylate (Histoacryl). RNA (with 99mTc-diethylenetriamine pentaaceti acid) was performed before and after the palliative embolization to evaluate the result of this treatment. If RNA revealed residual perfusion of the tumor, functional scintigraphy with 131I-hippuran was performed to quantity the residual function. Neither residual perfusion nor residual function was found for up to 16 mo after embolization in 7/14 patients. Residual perfusion without residual functional renal parenchyma was found in five patients and residual renal perfusion with residual functional parenchyma in two. The angiography showed a tumor halo due to radioactivity accumulated by capsular arteries surrounding the avascular tumor in four cases. RNA proved to be a suitable noninvasive method for the follow-up of patients with embolized renal-cell carcinoma. (26 Refs) (In GER)

31. GALLIUM-67 SCANS IN RENAL TUMORS.

Adler J, Greweldinger J, Conradi H
Dept. Radiology, Englewood Hosp., 350 Engle St., Englewood, NJ, 07631
Urol Radiol; 3(1):27-29 1981

Two cases in which uptake of Gallium-67 into renal tumors helped in the diagnosis of these lesions are described. Although most uptake of gallium in the renal area is related to infection, occasionally it is due to neoplasms including leukemia, lymphoma, metastatic melanoma, renal carcinoma, and sarcoma. (8 Refs)

32. STANDARDIZATION OF BONE IMAGING IN METASTATIC CANCER OF THE PROSTATE (MEETING ABSTRACT).

Espinola DA, Gober A, Camargo EE, McCullough A, Scott WW, Wagner HN
The Johns Hopkins Medical Institutions, Baltimore, MD
28th Annual Meeting of the Society of Nuclear Medicine, June 16-19, 1981, Las Vegas, Nevada The Society; 1981

As part of a collaborative multi-institutional therapeutic trial, a method of consistently reproducing serial bone images in patients (pts) with metastatic disease for visual and quantitative interpretation has been developed. The essence of the method is the use of a flood source as standard for 2 purposes: 1) to match the precise intensity on a 35mm high contrast film for each pt's study; 2) to obtain bone/flood source count ratios for normal and abnormal areas. Pts and source are injected respectively w ith 20 and 3 mCi Tc-99m methylene diphosphonate with pre and post syringe assay to calculate the injected doses. Bone and source are imaged 2-4 hr later with a 140 keV high resolution parallel hole collimator on a LFOV scintillation camera interfaced to a computer. Fourteen equal time images reproducing the same anatomical landmarks with the same information densities are begun immediately after voiding using exactly the same sequence for the various segments of the skeleton. A 3 mo follow up study comparing visual and quantitative data was begun with 28 pts. Initial experience in paired studies in 10 of these pts indicates that the method is very reproducible. Our results have also indicated that although the visual method may suffice to detect worsening of the lesions in most pts, both standardization and quantification have improved the objective assessment of the response to therapy. (no Refs)

33. LOCALISATION OF MALIGNANT TERATOMA DEPOSITS BY EMISSION SCANNING AFTER INJECTION OF RADIO-LABELLED ANTIBODY TO ALPHA-FETOPROTEIN (MEETING ABSTRACT).

Fairweather DS, Bradwell AR, Dykes PW
Department of Immunology, University of Birmingham Medical School, Birmingham B15 2TJ, England
Clin Sci; 61(3):1P 1981

Alpha-fetoprotein (AFP) is used as a tumor marker in germ cell tumors. This study was performed to see if deposits of these tumors could be identified by external scanning after injection of radio-labelled antibody to AFP. The antibodies were raised in sheep by immunization with AFP extracted from amniotic fluid. After immunoadsorption with normal sera the IgG was further purified by ion-exchange chromatography. Samples were tested for acute toxicity and pyrogenicity in rabbits. The purified antibody was labelled with 131I using the Chloramine-T method and injected into the patients after an initial uneventful test dose. Before the scan, the patient also received 99mTc

pertechnetate and 99mTc-labelled human serum albumin to outline the extra vascular space and blood pool to enable subtraction scanning to be performed. A total of 15 scans were performed on 12 patients, ten with Malignant Teratoma, one with an Endodermal Sinus Tumor and one with a Seminoma (used as a negative control). All nine patients with elevated serum AFP gave positive scans. Five of these were performed at the time of diagnosis and all abnormal areas were confirmed by computed tomographic (CT) scans and lymphangiography, although three secondary deposits were missed. Three patients gave normal scans when studied again after successful treatment, and when the serum AFP had fallen to normal. A further five gave positive scans, three of which were confirmed by CT scanning. These preliminary results show that it is possible to identify malignant teratoma deposits using antibody to AFP. (no Refs)

34. LOCALISATION OF HUMAN TUMOURS BY EXTERNAL SCANNING AFTER INJECTION WITH RADIOLAB ELLED ANTIBODY TO AFP (MEETING ABSTRACT).

Fairweather DS, Halsall AK, Hine KR, Howell A, Dykes PW, Bradwell AR, Blackburn J, Reader A
Departments of Medicine, Oncology, Immunology and Medical, Physics Queen Elizabeth Medical Center and the General Hospital, Birmingham, England
Br J Cancer; 43(5):726 1981

Alpha-fetoprotein (AFP) is used as a tumor marker in germ-cell tumors. This preliminary study was carried out to assess whether deposits of these tumors could be identified by external scanning after injection of radio-labelled antibody to AFP. A total of 15 scans were performed on 12 patients, 10 with malignant teratoma, one with an endodermal sinus tumor and one with a seminoma (used a negative control). All 9 patients with high serum AFP gave positive scans; 5 of these at the time of diagnosis. All abnormal areas were confirmed by computerized tomography (CT) scans and lymphangiography, although 4 secondary deposits were missed. Three patients gave normal scans when studied again after successful treatment, and when the serum AFP had fallen to normal. A further 5 studied for the first time after treatment (4 with high serum AFP) gave positive scans, 3 of which were confirmed by CT scanning. Two areas of anti-AFP uptake over the stomach were not confirmed by the CT scans. These preliminary results show that it is possible to identify tumor deposits using antibody to AFP. (no Refs)

35. RADIOIMMUNASSAY OF PROSTATIC ACID PHOSPHATASE IN PROSTATIC CANCER (MEETING ABSTRACT).

Daver A, Tellier JL, Lavenet F, Chatal JF
GERCO, Rue Moll, 49000 Angers, France
Oncodev Biol Med; AbstractsBook,1:P14 1981

Radioimmunoassay of prostatic acid phosphatase (PAP) was performed on 72 reference subjects, 139 benign hyperplasia, 152 untreated prostatic cancer, 60 non-prostatic cancer patients. Mean concentration of PAP in non-acidified serum was 1.3 +/-0.4 (M +/- SD) ng/ml for reference subjects and 1.7 +/-0.7 for the group with benign hyperplasia. The upper discriminative level for diagnosis of prostatic carcinoma was set at 3.2 ng/ml. The overall positive rate for untreated prostatic cancers (all stages combined) was 57.9% (88/152). The number of cases with a higher concentration than 3.2 ng/ml was 4/26 (15%) for stage A, 10/23 (30%) for stage B, 8/24 (33%) for stage C and 67/69 (97%) for stage D. For non-prostatic cancers the positive rate was 3.3 (2/60). Serum PAP level were measured before lymphadenectomy in 12 patients previously classified as stage A (5), B (6), C (1), with no estrogenic or radiotherapeutic treatment, and with a negative bone scintigraphy. This was followed by an anatomo-pathological analysis of the lymph-nodes extracted so as to check the precise stage of the cancer. For 11 patients, 3 (L+ PAP+) and 8 (L- PAP-), the level was correlated with the presence or absence of lymph-node infiltration. One patient classed as B presented a discordance (L+ PAP-); he had a micrometastasis. The test has no value in early prostatic cancer diagnosis. However the test has satisfactory specificity and a high degree of sensitivity in the diagnosis of metastases. (no Refs)

HEAD AND NECK NEOPLASMS

36. RADIONUCLIDE SALIVARY GLAND IMAGING.

Mishkin FS
Dept. Radiology, Div. Nuclear Medicine, Martin Luther King, Jr. General Hosp. Los Angeles County, Los Angeles, CA, 90059
Semin Nucl Med; 11(4):258-265 1981

Salivary gland imaging with 99mTc as pertechnetate provides functional information concerning trapping and excretion of the parotid and submandibular glands. Anatomic information gained often adds little to clinical evaluation. On the other hand, functional information may detect subclinical involvement, which correlates well with biopsy of the minor labial salivary glands. Salivary gland abnormalities in systemic disease such as sarcoidosis, rheumatoid arthritis, lupus erythematosus, and other collagen-vascular disorders may be detected before they result in the clinical manifestations of Sjogren's syndrome. Such glands, after initially demonstrating increased trapping in the acute phase, tend to have decreased trapping and failure to discharge pertechnetate in response to an appropriate physiologic stimulus. Increased uptake of gallium-67 citrate often accompanies these findings. Inflammatory parotitis can be suspected when increased perfusion is evident on radionuclide angiography with any agent. The ability of the salivary gland image to detect and categorize mass lesions, which result in focal areas of diminished activity such as tumors, cysts, and most other masses, is disappointing, while its ability to detect and categorize Warthin's tumor, which concentrates pertechnetate, is much more valuable although not specific. (Author abstract) (31 Refs)

37. RADIONUCLIDE DIAGNOSIS OF LARYNGEAL CANCER WITH 111IN-BLEOMYCIN.

Kasatkin IuN, Pogosov VS, Purizhanskii II, Krotkov FF, Davudov KhSh, Akopian RG, Vidiukov VI
Dept. Medical Radiology, Municipal Clinical Hosp. No. 67, Moscow, USSR
Vestn Otorinolaringol; (5):48-51 1981

Diagnostic efficacy of radionuclide examination with 111In-bleomycin was evaluated in 56 patients (54 men, 2 women; 32-82 yr old) with cancer of the larynx. Two patients had Stage I, 9 had Stage II, 39 had Stage III, and 6 had Stage IV; histologically, 42 had squamous cell keratinizing carcinoma, 10 had squamous cell nonkeratinizing carcinoma, 1 had weakly keratinizing carcinoma, and 1 had papilloma with transition into squamous cell carcinoma. Accumulation of the radionuclide in the larynx was recorded in 48/56 patients. The results of scintigraphy were false negative in 8/56 (2 had Stage I, 5 had Stage

II, and 1 had Stage III). In one patient, radionuclide showed accumulation in the neck lymph nodes, which indicated the potential use of 111In-bleomycin scintigraphy for the diagnosis of regional metastases of cancer of the larynx. (12 Refs) (In RUS)

HEMATOLOGIC, RETICULOENDOTHELIAL, AND LYMPHATIC NEOPLASMS

38. CHILDHOOD ACUTE LEUKEMIA: A SEARCH FOR OCCULT EXTRAMEDULLARY DISEASE PRIOR TO DISCONTINUATION OF CHEMOTHERAPY.

Mahoney DH, Gonzales ET, Ferry GD, Sanjad SA, Von Noorden GK, Fernbach DJ
Res. Hematology Lab., Texas Children's Hosp., 6621 Fannin St., Houston, TX, 77030
Cancer; 48(9):1964-1966 1981

Between January 1978 and September 1979, 29 children with acute leukemia in complete continuous remission for 3 or more yr were examined for evidence of occult extramedullary disease immediately prior to discontinuation of chemotherapy. Bilateral open wedge testicular biopsy demonstrated the presence of bilateral leukemic infiltrates in 2/13 boys. Gallium scans prior to biopsy had identified unilateral infiltration in an enlarged testis in one patient but failed to identify microscopic disease in the opposite testis or in the testes of the second patient. Percutaneous kidney and liver biopsies, pelvic ultrasonography, iv pyelogram, skeletal survey, cranial computed axial tomography scan, electroencephalography, and ophthalmologic examinations failed to demonstrate evidence of occult disease. Except for testicular biopsy, this study does not support extensive clinical or invasive procedures to identify extramedullary disease prior to discontinuation of chemotherapy. (Author abstract) (12 Refs)

39. WHOLE BODY GALLIUM SCANNING IN MALIGNANT LYMPHOMA - ITS ROLE IN 1980 (MEETING ABSTRACT).

McLaughlin AF, Chu J, Howman-Gills R
Department of Nuclear Medicine, Royal Prince Alfred Hospital, Camperdown, New South Wales, Australia
Aust NZ J Med; 11(4):436 1981

Whole body gallium scanning is not a new technique but recent improvements in instrumentation (triple pulse height analysis, improved resolution and area scanning with gamma cameras), have markedly improved its sensitivity. It is now used extensively in our institution for the assessment of lymphoma patients: (1) as an initial baseline study: (2) possible extra nodal disease: and (3) for recurrence disease. Whole body gallium studies were performed at 48 and 72 hr after injection. They were performed on a large field camera, using triple pulse height analysis and area scanning. Spot views of the head and neck, thorax, abdomen and pelvis were routine at the 72 hr study and other views were performed where appropriate. Grey Scale Ultrasound of the abdomen was performed in all cases. Eighty-three studies were performed on patients with Hodgkin's disease (HD) and 104 studies in patients with non-Hodgkin's lymphoma (NHL). Sixt y-two patient studies with HD were deemed to be active clinically. Fifty-nine had positive gallium scans, giving a sensitivity of 95%. Twenty-one patient studies were in clinical remission, but three had positive scans giving a specificity of 76%. Eighty patient studies with NHL were deemed to be active clinically. Sixty-nine had positive gallium scans giving a sensitivity of 86%. Twenty-four patient studies were in clinical remission but three had positive scans giving a specificity of 88%. Whole body gallium studies using contemporary instrumentation are a highly sensitive test for the detection of active malignant lymphomatous disease. In our experience its sensitivity in NHL is higher than previously reported. It is an essential part of the work up of all patients with lymphoma. (no Refs)

40. INTRA-TUMORAL CONSUMPTION OF INDIUM-111 LABELED PLATELETS (MEETING ABSTRACT).

Warrell RP
Memorial Sloan-Kettering Cancer Center, New York, NY, 10021
Chesapeake Conference on Hemostasis and Malignancy-Interaction of Platelets and Tumor Cells, June 26-30, 1981, St Mary's Maryland American Red Cross; 1981

We recently studied an adult patient with hemangiomatosis, intravascular coagulation, and thrombocytopenia (Kasabach-Merritt Syndrome) by external imaging following injection of autologous platelets labeled with Indium-111. Platelets from two units of whole blood were isolated and incubated with Indium-111-oxine for 15 min in a plasma-free soln. Platelets disappeared from the patient's whole blood with an initial half-life of 22 hr. The patient was imaged at 2, 22, 24, and 48 hr using a gamma camera with computer-assistance for visual display. The scans showed prompt, intense localization of platelet-associated radioactivity in areas of the right hemithorax, corresponding to tumors noted on chest roentgenogram and computerized tomography-scan. Despite the presence of multiple other hemangiomata, including a posterior thoracic mass, two large abdominal masses, and numerous skeletal lesions, platelet radioactivity was otherwise normally confined to liver and spleen. We then compared the max count rates within the tumors relative to the cardiac blood pool using data sequentially obtained from both the gamma camera and rectilinear scanner. The ratio of tumor:blood-pool radioactivity continually increased over the 48 hr period of observation. Administration of heparin in a continuous iv infusion for 5 days reduced the coagulopathy, but the platelet count did not increase. We conclude that platelets are locally consumed within certain hemangiomata, but that even within the same individual there exists considerable heterogeneity among these lesions with respect to their platelet trapping ability. Furthermore, it is quite possible that the intravascular coagulation and thrombocytopenia observed in these patients occur by independent mechanisms. We suggest that the intratumoral consumption of platelets seen in patients with the Kasabach-Merritt Syndrome may occur to a more subtle degree in other patients with neoplastic diseases. (no Refs)

41. VISUALIZATION OF CUTANEOUS HEMANGIOMA WITH TC-99M TAGGED RED BLOOD CELLS.

Gordon L, Vujic I, Spicer KM
Nuclear Medicine Div., Medical Univ. South Carolina, 171 Ashley Ave., Charleston, SC, 29425
Clin Nucl Med; 6(10):468-469 1981

Scintigraphy with Tc-99m labeled RBC was used to evaluate a patient with a large cutaneous hemangioma. The usefulness of this procedure when combined with arteriography is discussed. (Author abstract) (6 Refs)

42. PHAGOCYTIC AND PROTEOLYTIC ACTIVITY OF LIVER, SPLENIC AND BONE MARROW MACROPHAGES: VALUABLE PARAMETERS OF THE IMMUNE STATUS IN TUMOR PATIENTS? (MEETING ABSTRACT).

Munz D, Hor G
University of Frankfurt, D 6 Frankfurt, W. Germany
Eur J Nucl Med; 6:A22 1981

Non-invasive in vivo measurement of macrophage functions is expected to yield useful information on the immune status of patients with various diseases. With a new method the kinetics of phagocytosis and proteolytic metabolism of 99m-Tc-labeled human serum albumin millimicrospheres (HSA-MM) in sinus lining fixed macrophages of liver, spleen and bone marrow were simultaneously studied. After iv injection of 100/uCi/kg body wt HSA-MM liver, spleen and axial bone marrow were sequentially scanned with a gamma camera in posterior view. Time activity curves obtained over regions of interest were computer-fitted with three exponential functions. Five normal persons and 38 patients with different malignant tumors were examined. By use of a distinct three compartment model describing the turnover of HSA-MM at the cellular level it could be demonstrated that in tumor patients especially the transfer of HSA-MM from the macrophage membrane-receptor sites to the intracellular macrophage pool as well as proteolytic degradation was considerably reduced compared to normals. This was most pronounced in cases with poor prognosis. In patients showing tumor remission phagocytic and proteolytic activity returned to nearly 'normal' range, whereas in progressing tumors these parameters moved to worse values. (no Refs)

43. FERROKINETICS AFTER HIGH-DOSE METHOTREXATE THERAPY.

Schalhorn A, Sauer H, Wilmanns W, Stupp-Poutot G
Med. Klinik III, Station G 21, Klinikum Grosshadern, Marchioninistr. 15, D-8000 Munchen 70, W. Germany
Klin Wochenschr; 59(19):1109-1113 1981

After high-dose methotrexate with doses ranging from 2-10 g/m2, ferrokinetics were performed in 11 patients with different tumors. Iron-III-citrate-59Fe was injected at methotrexate serum concentrations ranging between 2.7 x 10(-7) -1.3 x 10(-8) M. With MTX levels greater than or equal to 4.2 x 10(-8) M the plasma iron clearance was always retarded, and the plasma iron turnover was diminished in five of six patients with levels of 3.1-8.9 x 10(-8) M at the time of the injection. In all cases with MTX concentrations greater than or equal to 5 x 10(-8) M the 59Fe-utilization as the measure of effective erythropoiesis was reduced pathologically below normal range. These results show that the erythropoiesis resumes its normal extent even in case of normal methotrexate clearance only when the methotrexate serum concentrations have fallen down below 5 x 10(-8) and that erythropoiesis is more sensitive against methotrexate toxicity than the granulocytopoiesis. (Author abstract) (18 Refs)

MUSCULOSKELETAL NEOPLASMS

44. QUOTIENT IMAGING WITH N-13 L-GLUTAMATE IN OSTEOGENIC SARCOMA: CORRELATION WITH TUMOR VIABILITY.

Reiman RE, Huvos AG, Benua RS, Rosen G, Gelbard AS, Laughlin JS
210 Kettering Lab., Memorial Sloan-Kettering Cancer Center, 425 East 68th St., New York, NY, 10021
Cancer; 48(9):1976-1981 1981

An investigation was performed to correlate the regional uptake of N-13 L-glutamate with histologic changes in tumor tissue in patients undergoing adjuvant chemotherapy for osteogenic sarcoma. A parametric image was produced by calculating the ratio of N-13 uptake in the tumor in a pixel-by-pixel fashion, using the presurgical scan as the numerator and the pretherapy scan as the denominator. The change in N-13 uptake in 2 x 2-cm regions of the tumor was compared with residual cell viability as determined by microscopic examination of multiple thin sections obtained from the surgical specimens. Regions that showed decreases in N-13 uptake of more than 30% were frequently associated with areas of highly necrotic tumor, and regions that showed increasing uptake were associated with high residual cell viability and incomplete response to chemotherapy. (Author abstract) (15 Refs)

45. DETECTION OF LUNG METASTASES FROM OSTEOSARCOMA BY SCINTIGRAPHY USING 99MTC-METHYLENE DIPHOSPHONATE.

Hoefnagel CA, Bruning PF, Cohen P, Marcuse HR, Van der Schoot JB
Dept. Nuclear Medicine, Antoni van Leeuwenhoek Ziekenhuis, The Netherlands Cancer Inst., Plesmanlaan 121, 1066 CX Amsterdam, The Netherlands
Diagn Imaging; 50(5):277-284 1981

The results of 99mTc-methylene diphosphonate 99mTc-MDP scintigraphy in 37 osteosarcoma patients were evaluated. In 11 of 12 patients with pulmonary metastases these were demonstrated by the scintigram. In 2 of these 11 patients the lung metastases could be shown earlier by scintigraphy than by x-ray tomography. Uptake of 99mTc-MDP appeared to be correlated with the formation of osteoid by the tumor. 99mTc-MDP scintigraphy demonstrated metastases not only in the lungs and the skeleton, but also in the lymph nodes and soft tissues. 99mTc-MDP whole-body scintigraphy should be used routinely for the early detecti on of osteosarcoma metastases. (Author abstract) (17 Refs)

46. 99MTC-MDP SCINTIGRAPHY FOR DETECTION OF EXTRAOSSEUS METASTASES FROM OSTEOSARCOMA (MEETING ABSTRACT).

HoefnagelCA, Bruning PF, Cohen P, Marcuse HR, van der Schoot JB
No affiliation given
Eur J Nucl Med; 6:82 1981

X-ray tomography of the lungs is a well established method for the detection of lung metastases in osteosarcoma. However in autopsies the frequency of pulmonary metastases is higher than is demonstrated by radiography alone. To determine the value of technetium methylene diphosphate(99mTc MDP)-scintigraphy for this indication we retrospectively compared results of total body scintigraphy and x-ray tomography of the lungs in 41 patients, of whom 26 developed lung metastases. In 14 patients both examinations were done at the time lung me-

tastases were present. In 13 of these patients 99mTc-MDP-scintigraphy clearly demonstrated pulmonary metastases (92.9%). Altogether results of 69 bone scinitigrams could be correlated to those of x-ray tomography; the sensitivity of scintigraphy for the detection of lung metastases was 88.9%, the specificity 100%. In 2 patients scintigraphy showed lung metastases 1-2 mo prior to the first radiographic abnormality, whereas in another patient no 99mTc-MDP-uptake in the lungs was seen. This appeared to be correlated to the degree of differentiation of the tumor. 99mTc-MDP scintigraphy is of great value in osteosarcoma not only for the detection of pulmonary metastases, but also of skeltal metastases and metastases in lymph nodes and other soft tissue. 99mTc-MDP scintigraphy should be used as a routine in staging and follow-up of osteosarcoma. (no Refs)

47. THE EFFICACY OF BONE SCANNING IN THE DIAGNOSIS OF BONE METASTASES (MEETING ABSTRACT).

Harbert J

No affiliation given

28th Annual Meeting of the Society of Nuclear Medicine, June 16-19, 1981, Las Vegas, Nevada The Society; 1981

It is important that Nuclear physicians understand the efficacy of bone scanning in detecting bone metastases for the many types of cancer. This information is difficult to extract for comparative purposes from the radiologic and cancer literature because of varying criteria for positivity, varying populations and failure to define disease stage. We have recently completed a review of the world's literature in order to derive reasonable estimates of bone scanning efficacy for breast carcinoma, bronchogenic carcinoma, colon and rectal carcinoma, melanoma, neuroblastoma, prostatic carcinoma, cervical carcinoma, uterine and ovarian carcinoma, Ewing's Sarcoma, and osteogenic sarcoma. The efficacy of bone scanning in these neoplasms varies greatly with the stage of cancer at the time of the diagnostic workup and the presence or absence of clinical symptoms. In many cases bone scanning is of no apparent value while in others it is essential . (no Refs)

48. OPTIMIZING THE PERFORMANCE AND INTERPRETATION OF BONE SCANS.

Muroff LR

Dept. Nuclear Medicine, Univ. Community Hosp., Tampa, FL, 33612

Clin Nucl Med; 6(10,Suppl):P68-P76 1981

There are no false-positive scans; only inaccurate explanations for the findings. An appreciation for (if not an understanding of) of the mechanisms of action for bone-scanning agents, a thorough clinical history (including the current problem and all pertinent past procedures), and when all else fails, an examination of the patient will dramatically decrease the uncertainties of bone scan interpretation. Often a precise diagnosis is not possible; sometimes a precise diagnosis is not necessary-the clinician being merely content with the knowledge that an abnormality is or is not present. What is important is that the nuclear physician is able to extract the max diagnostic information available from a given bone scan and not exceed the limitations of the study. Clinician confidence in a study depends on honesty, as well as accuracy. (Author abstract) (48 Refs)

49. UPTAKE OF 99M-TC-PYROPHOSPHATE IN SOFT TISSUES (MEETING ABSTRACT).

Pinedo JI, Marin D, Ramos J, Castejon I, Chamorro JL, Ortiz Berrocal J

Clinica Puerta de Hierro, Madrid, Spain

Eur J Nucl Med; 6:A25 1981

The reason of this paper is to present those cases in whom we have detected uptakes of 99m-Tc-Pyrophosphate in soft tissues, like the fortuitous findings in the conventional bone scintigraphy. Out of a total of 8,000 bone scannings accomplished in the last 5 yr, we have detected in 25 patients uptake of 99m-Tc-Pyrophosphate in soft tissue, where normally it is not usual; so, we exclude those patients with uptakes in breasts, in myocardium, in lymph nodes (findings which are relatively easy to see in the bone scintigraphy, and whose uptake mechanisms have been frequently debated in the literature). The 25 patients which are discussed in this paper, can be divided in 3 different groups depending on the uptake localizations: 1) lung uptakes, due to neoplasm of lung: 9 cases; 2) liver uptakes, due to hepatic metastasis from carcinoma of the colon: 5 cases; 3) muscle uptakes, due to different causes: myosarcoma, liposarcoma, fibrosarcoma, malign histiocytoma (11 cases). Our conclusions are: a) The uptakes in the lung can be in the original tumor or in the carcinomatous effusion; b) the uptakes in the liver suggest, provided there are no x-ray calcification, hepatic metastasis from carcinoma of the colon; c) the original tumors of the muscle attract the 99m-Tc-Pyrophosphate, independently of its histopathology. (no Refs)

RESPIRATORY AND CARDIOVASCULAR NEOPLASMS

50. VENTILATION-PERFUSION IMAGING IN PULMONARY PAPILLOMATOSIS.

Espinola D, Rupani H, Camargo EE, Wagner HN

Div. Nuclear Medicine, Johns Hopkins Medical Inst., 615 North Wolfe St., Baltimo re, MD, 21205

J Nucl Med; 22(11):975-977 1981

Three children with laryngeal papillomas involving the lungs had serial ventilation-perfusion scintigrams to assess results of therapy designed to reduce the bronchial involvement. Different imaging patterns were observed depending on size, number, and location of lesions. In early parenchymal involvement a ventilation-perfusion mismatch was seen. The initial and follow-up studies correlated well with clinical and radiographic findings. This noninvasive procedure is helpful in evaluating ventilatory and perfusion impairment in these patients as well as their response to treatment. (Author abstract) (8 Refs)

51. GALLIUM SCAN IN THE EVAULATION OF MEDIASTINAL SPREAD OF LUNG CANCER: A CONTROLLED STUDY (MEETING ABSTRACT).

Frediani M, Solfanelli S, Pistelli G, Angeletti CA, Mussi A, Giuntini C

No affiliation given

Eur J Nucl Med; 6:61 1981

The aim of this investigation was to evaluate the usefulness of 67Ga scintigrams verus chest x-ray (XR) in the staging of bronchogenic carcinoma (BC). Fourty operable patients with BC (37 males, 3 females) were studied. The preoperative evaluation included XR in frontal and lateral projections. 67 Ga

scan was undertaken 48, 72 and 144 hr after the iv injection of 2-5mCi of 67Ga-citrate. Scans were performed with gamma camera set with a 20% window at the 93KeV peak, collecting 400,000 counts/image and using medium-energy collimator. In each patient, images of the mediastinum were obtained in anterior, posterior and lateral views. The 67Ga scintigrams were judged (-) for mediastinal spread if abnormal uptake in or adjoining the mediastinum was not detected. Abnormal or equivocal uptake was judged (+). The results indicate that 67Ga scan is an accurate, noninvasive technique in staging BC. Both the sensitivity (ability to detect mediastinal spread when present) and specificity (ability to exclude spread when absent) proved superior to XR. Our results with 67Ga scan match the specificity reported for computerized tomography and top the sensitivity of this technique. (no Refs)

52. DETECTION OF INTRATHORACIC METASTASES FROM BRONCHOGENIC CARCINOMA WITH GALLIUM CITRATE AND COBALT BLEOMYCIN (MEETING ABSTRACT).

Lovegrove FT, Tribe AE
Sir Charles Gairdner Hospital, Nedlands, Australia
Aust NZ J Med; 11(4):443 1981

Carcinoma of the lung remains an increasingly common cause of death in Australia. When early detection allows complete resection of the primary tumor, a surgical cure is possible. Clinical examination, radiology, mediastinoscopy, and biopsy are used to define metastatic disease within the chest. Tumor seeking radioisotopes were evaluated for the detection of thoracic metastases. Pathological confirmation obtained at thoracotomy or mediastinoscopy was compared with radiology and nuclear medicine studies. Using Gallium-67-citrate (Ga 67) in 21 patients, the primary tumor had no significant uptake in seven. Where primary uptake was present (14) the scan detected metastases in three of the four cases with metastases (75%). One false positive was reported. Cobalt 57 Bleomycin (BLEO) was evaluated because of the low sensitivity of Ga 67 for primary lung cancer (67%). The sensitivity for BLEO was greater than 95%. The sensitivity for thoracic metastases was also higher, but an unacceptable false positive rate was noted. This required stricter criteria for interpretation to be applied. It is concluded that BLEO is a more acceptable tumor seeking tracer than Ga 67, and the use of BLEO is evaluating thoracic metastases from primary lung carcinoma is continuing. (no Refs)

53. POSITIVE-TRACER SCANNING IN BENIGN CHEST TUMORS. HISTOPATHOLOGIC CORRELATIONS IN 63 CASES (MEETING ABSTRACT).

Maini CL, Pau F, Pigorini F, Storniello G
Ospedale Spec. 'C. Forlanini', Via Portuense, Rome, Italy
Eur J Nucl Med; 6:A20 1981

While there is general agreement that positive tracers concentrate in both malignant tumors and inflammations, reports on their behavior in benign tumors are occasional and usually ambiguous, probably due to the very low incidence of histologically proved benign tumors in published series. At our institution over 4000 positive tracer chest scans were performed for a variety of pathological conditions, including 63 benign tumors all proved at surgery. Positive-tracer uptake was found in 15 of these cancers, so called 'false positive' studies. The hypothesis that even in benign tumors positive-tracer uptake is dependent on the lesion metabolic rate was proved by correlating tracer uptake with histopathological findings. In fact an increase in cellular density, proliferating activity, a rich network of newly formed capillary buds and an increase of extracellular fluid space were constant findings in these so-called 'false positive' cases. (no Refs)

54. CARDIAC TUMOURS: VALIDITY AND LIMITATION OF NON-INVASIVE DETECTION BY FIRST PASS AND EQUILIBRIUM RADIONUCLIDE IMAGING (MEETING ABSTRACT).

Barsotti A, Mariotti R, Bencivelli W, Bellina CR, Tartarni G, Mariani M
No affiliation given
Eur J Nucl Med; 6:6 1981

Two patients with intracardiac peduncolated tumors were investigated flushing 15mC of technetiumpertechnetate in a peripheral vein, thirty min after iv pyrophosphate injection in order to obtain the 1st pass and equilibrium radionuclide imaging. In addition, bidimensional echo cardiography and contrast angiocardiography were also performed. In one patient, a large peduncolate right atrial myxoma, prolapsing towards the right ventricle during the filling period, was evidenced by all three techniques and confirmed at surgery. In this case, the 1st pass technique appeared more sensitive than the equilibrium one, probably due to the absence of radioactivity from superimposable structures. In the other patient, left atrial, peduncolate myxoma, was only evidenced by bidimensional echocardiography and contrast pneumoangiography, while both the 1st pass and equilibrium radionuclide imaging failed to obtain diagnostic picutures. This was explained on the basis of surgical results, which evidenced a left atrial myxoma of small dimension with a lobulated shape. In conclusion, the radioisotopic angiocardiography may be a complementary technique to echocardiography for the non-invasive detection of cardiac tumors. (no Refs)

MISCELLANEOUS

55. GALLIUM SCANNING IN INFLAMMATORY AND NEOPLASTIC CONDITIONS.

Silberstein EB
Eugene L. Saenger Radioisotope Lab., Univ. Cincinnati Medical Center, Cinncinnati, OH, 45276
Clin Nucl Med; 6(10,Suppl):P63-P67 1981

The use of Ga-67 for identification of tumors and inflammatory disorders is described. One of the mechanisms proposed for Ga-67 uptake in neoplasms involves transferrin binding of the radioisotope. Granulocyte lactoferrin appears to be the major Ga-67 binding protein in areas of infection. Siderophores and ferritin may play a role in Ga localization. The optimal instrumentation for Ga scintigraphy is described. Proper interpretation of a Ga scan requires experience with normal Ga distribution and with its physiologic variants. Ga scintigraphy will not detect lesions less than 15-20 mm in diameter. For tumor detection, the sensitivity of Ga is less than 70%; it is not considered useful for the following tumors: carcinoma of the esophagus, stomach, small bowel, colon and rectum, pancreas, breast, bladder, vagina, cervix, uterus, testicle, prostate, ovary, kidney, and thyroid, as well as myeloma, melanoma, leukemia, carcinoma of the head and neck, and Wilms' tumor. Approx sensitivities of Ga-67 for pulmonary carcinoma, hepatoma, and Hodgkin's disease are 80-95%, 86-95%, and 87%, respectively.

Use of Ga-67 for diagnosis of a variety of infectious and aseptic inflammatory diseases is described. (65 Refs)

56. RADIONUCLIDE IMAGING OF SOFT TISSUE NEOPLASMS.

Chew FS, Hudson TM, Enneking WF
(c/o Hudson) Dept. Radiology, Univ. Florida, Box J-374 J.H.M.H.C., Gainesville, FL, 32610
Semin Nucl Med; 11(4):266-276 1981

Two classes of radiopharmaceuticals may be used for imaging tumors of the musculoskeletal system. The first is comprised of soft tissue or tumor-specific agents such as gallium-67, bleomycin, and radionuclide-labeled antibodies, which may be useful for detecting and localizing these tumors. The other class of tracer is comprised of those with avidity for bone. The 99Tc-labeled-phosphate skeletal imaging compounds have been found to localize in a variety of soft tissue lesions, including benign and malignant tumors. In 1972, Enneking began to include bone scans in the preoperative evaluation of soft tissue masses. Later, he and his associates reported that these scans were useful in planning operative treatment of sarcomas by detecting involvement of bone by the tumors. Nearly all malignant soft tissue tumors take up bone-seeking radiopharmaceuticals, and bone involvement was indicated in two-thirds of the scans we reviewed. About half of benign soft tissue lesions had normal scans, but the other half showed uptake within the lesion and a few also showed bone involvement. Careful, thorough imaging technique is essential to proper evaluation. Multiple, high-resolution static gamma camera images in different projections are necessary to adequately demonstrate the presence or absence of soft tissue abnormality and to define the precise relationship of the tumor to the adjacent bone. (Author abstract) (24 Refs)

57. RADIONUCLIDE EJECTION FRACTION AND THE PREVENTION OF ADRIAMYCIN CARDIOTOXICITY (MEETING ABSTRACT).

Morgan GW, Molk GH, McIlveen BM, Freedman A, Murray IP
Department of Nuclear Medicine and Institute of Oncology and Radiation, Therapy The Prince of Wales Hospital Sydney, Syndey, Australia
Aust NZ J Med; 11(4):438 1981

Serial assessment of left ventricular function by radionuclide ejection fraction (EF) using a first-pass technique, was performed prior to each dose in 250 patients receiving adriamycin (A) therapy. Total A dosage was greater than 550 mg/m2 in ten patients, 350-550 mg/m2 in 30, 200-350 mg/m2 in 35, and less than 200 mg/m2 in 175. EF prior to the first dose of A in 150 patients showed a mean of 0.57. The criteria for cessation of A was an EF below 0.40 or a fall of 0.14 over three successive studies. The patients were classed in two groups; those with risk factors (mediastinal irradiation within 12/12 of commencing A, atherosclerosis, hypertension, electrocardiogram (ECG) evidence of left ventricle hypertrophy or old myocardial infarct) and those without such factors. In the latter group, although a gradual fall in EF was not uncommon, in none were the criteria for cessation observed nor did any develop clinical evidence of cardiotoxicity. In the 'risk factor' group, however, cessation was indicated in six patients. In four of these clinical cardiotoxicity did not develop and the EF subsequently increased. In one patient, A was discontinued when, after a cumulative dose of 680 mg/m2, the EF fell from 0.68 to 0.52 but subsequently at an EF of 0.48 congestive cardiac failure (CCF) and death occurred. CCF also occurred in another patient in whom the EF was 0.25 after only 60 mg/m2. It is concluded that an EF should be performed in all patients prior to commencing A therapy, and serially, prior to each dose, in those with risk factors or an initial EF less than 0.45. Serial studies are also indicated when the cumulative dose exceeds 450 mg/m2. Using this protocol and our criteria for the prediction of A cardiotoxicity, serious cardiac complications have only occurred in two of 250 patients. (no Refs)

58. LYMPHOSCINTIGRAPHIC DETERMINATION OF LYMPH DRAINAGE OF MALIGNANT MELANOMAS (MEETING ABSTRACT).

Haussermann I
No affiliation given
Zentralbl Haut Geschlechtskr; 145(4):274 1981

Nowadays treatment of malignant melanoma primarily consists of radical excision of the tumor with a tumor-free margin of at least 5 cm. In view of their predominant lymphatic metastasis route preventive lymphadenectomy, in continuity to the extent possible, should be performed in tumors classified as high risk. Hence the problem often arises, especially with melanomas on the trunk, of determining the respective draining lymph nodes. In numerous cases in which we decided on lymphadenectomy according to the Sappey model, metastases occurred in lymph node groups which had no connection with the primary tumor according to this model. Lymphoscintigraphy with 99mTc-antimony colloid seems to offer a solution to this problem. Consequently, there is on the one hand the opportunity to determine the draining lymph node region preoperatively, also different regions, respectively, and on the other hand the possibility of intraoperative delineation of radioactively labeled lymph tissue and precise localization in adipose tissue by means of a semiconductor detector-probe. In this way it is possible to differentiate between lymph tissue and other structures with great certainty and safety and at the same time shorten the time required for surgery. (no Refs) (In GER)

59. THE VALUE OF LIVER SCINTIGRAPHY IN THE FOLLOW-UP OF MALIGNANT MELANOMA (MEETING ABSTRACT).

Hugander A, Cederqvist E, Hafstrom L, Jonsson PE
University of Lund, Lund, Sweden
W.H.O. Seminar on Malignant Melanoma, June 24, 1981, Gothenburg, Sweden. World Health Organization 35 pp., 1981.

One hundred and nineteen patients operated on for malignant melanoma during 1960-1971 have been investigated with Technetium-scintigraphy of the liver because of recurrent disease or as a control during the follow-up. Ninety-six of these patients were classified according to staging described by Clark. The remaining cases were not classified according to Clark, ie tumor in the eye, regression of the primary tumor, unknown primary tumor, etc. In 7 cases with primary tumor Clark I-II, no liver metastases were diagnosed. Scintigraphy showed probably pathological result in one of those cases. In 89 patients with primary tumor Clark III-V eleven patients have developed liver metastases. Only in two of these cases the metastases were diagnosed by scintigraphy. Five patients have proved to have false positive scintigraphy. Out of 22 patients not classified according to Clark, nine patients developed or presented with liver metastases. In eight of these cases liver scintigraphy was positive. Two patients had a false positive scintigraphy. Liver scintigraphy in screening and follow-up of patients with malignant melanoma gives false negative results in approx 50% of the cases and false positive results in 10% of the cases. Liver scintigraphy seems to have no advantage com-

pared to standard laboratory analyses including alkaline phosphatases, S-GT and transaminases. (no Refs)

60. SIGNIFICANCE OF AMINO ACID TRANSPORT FOR TUMOR IMAGING (MEETING ABSTRACT).

Knapp WH, Helus F, Georgi P, Ostertag H, Becker W
No affiliation given
Eur J Nucl Med; 6:92 1981

Positive tumor imaging by conventional radionuclide methods is either based on perifocal reactions induced by the neoplasia or on rather unspecific alterations of transmembrane diffusion capacities. This benefits early tumor detection; radioactivity, however, does not represent the malignancy of the individual tumor at any time. Since increased amino acid intracellular transport is well established for cancer cells, in-vivo uptake measurements by radionuclide methods have been proposed. The purpose of our investigation was to evaluate the hypothesis of the correlation of amino acid uptake with malignancy in-vivo. After enzymatic synthesis of N-13-glutamic acid, 4-5 mCi of the radiopharmaceutical was intravenously injected. Imaging was performed by a special position scanner which allows for absorption and half-life correction. A total of 36 patients having different tumor localization and histology, was investigated under three aspects: a) focal extension of enhanced glutamate uptake compared with intraoperative findings and with conventional scintigraphy, b) uptake in benignity and inflammation, c) behavior of tumor uptake under radiotherapy. The results confirm the enhanced uptake of glutamate to be clinically related to malignancy. The administration of non-metabolizible amino acids and the use of positron tomography will allow for quantitative determination of transport rates. (no Refs)

SELECTED PRE-CLINICAL STUDIES

61. EFFECT OF WALKER 256 TUMOR OF TURPENTINE ON HEMOSTATIC FACTORS LOCALLY AND GENERALLY IN RATS.

Owen CA
Mayo Clinic and Mayo Foundation, Rochester, MN, 55901
Eur J Cancer Clin Oncol; 17(8):919-924 1981

Injection of Walker 256 carcinosarcoma sc into rats led to an immediate hyperfibrinogenemia followed in a few days by thrombocytosis. Other coagulation factors were only modestly affected. Associated with the early growth of the tumor was a marked accumulation of 125I from labeled fibrinogen and 51Cr from labeled platelets in the tumor. These changes were closely approximated by injection of turpentine im into rats. (Author abstract) (20 Refs)

62. TRANSFERRIN IN TUMOR PROLIFERATION (MEETING ABSTRACT).

Aulbert E, Gericke D
Universitat Berlin, Berlin, W. Germany
Twelfth International Congress of Chemotherapy, July 19-24, 1981, Florence, Italy. The International Society of Chemotherapy 301 pp., 1981.

The addition of fetal calf serum is essential for the growth of cultured cells. In the serum, transferrin could be identified as the factor which promotes cell growth and which stimulates DNA-synthesis and cell division. Using three tumor models of different growth rates, we found an accelerated disappearance of 67Ga-labeled transferrin from the blood of tumor-bearing rats compared to normal rats. A close correlation could be demonstrated between the disappearance rate of 67Ga-transferrin and the proliferation rate of the tumors and the tumor mass. The transferrin was found to be accumulated within the tumor lysosomes. The enrichment of 67Ga-transferrin in the tissue of the rapidly growing tumor was 6 x as high as in the slowly growing tumor. In patients with malignant tumors of different histological types and different tumor mass there was also found an accelerated disappearance of 67Ca-transferrin from the blood. There also was a correlation between the disappearance of 67Ga-transferrin and the growth rate of the tumors and the tumor mass; that resembled the results obtained in experimental tumors. The tumor-induced loss of circulating transferrin was accompanied by a decreased serum transferrin concentration. Anticancer treatment producing a significant reduction of tumor mass was followed by an improvement of the disappearance rate of 67Ga-transferrin from the blood and the hypotransferrinemia. We conclude from these findings that transferrin is required and consumed by the proliferating tumor cell. The normalizing of the hypotransferinemia indicates the efficacy of the therapy. (no Refs)

63. PREPARATION OF SOLUBLE, CATIONIC, METALLOPORPHYRIN COMPLEXES AND THE EVALUATION OF AN INDIUM-111 COMPLEX FOR LYMPH NODE IMAGING (MEETING ABSTRACT).

Heindel ND, Vaum R, Burns HD, Risch Vr, Brady LW
Department of Radiation Therapy and Nuclear Medicine, Hahnemann Medical College, Philadelphia, PA
28th Annual Meeting of the Society of Nuclear Medicine, June 16-19, 1981, Las Vegas, Nevada The Society; 1981

The affinity of metalloporphyrins for lymphatic and neoplastic tissues prompted a study of soluble, cationic porphyrin ligand complexes for potential lymph node imaging. Complexes of Cu, Ga, and In have been prepared of tetra(4-N-methylpyridyl)porphyrin (TMPyP) and the In-111 labeled form chosen for animal evaluation. Indium chloride and TMPyP were reacted in refluxing dilute hydrochloride acid and the resulting metalloporphyrin isolated in greater than 90% yield, characterized by combustion and spectroscopi c analysis, and employed as a chromatographic standard for identification of the In-111 metalloporphyrin which was prepared by a similar method. In in vivo biodistribution of the labeled radiopharmaceutical was determined following iv administration to Wistar rats and favorable lymph node-to-blood, lymph node-to-muscle, and specific lymph node-to-surrounding tissue ratios were obtained at 4, 24, and 48 hr post-dosing. Av node-to-muscle ratios of 72/1, thoracic node-to-heart of 16/1 and thoracic node-to-blood of 63/1 were obtained at 48 hr. The agent appears to hold promise for delineation of all nodal groupings with a single injection. (no Refs)

64. GAMMA-EMITTING ESTROGENS: DEVELOPMENT OF IMAGING AGENTS FOR BREAST TUMORS (MEETING ABSTRACT).

Katzenellenbogen JA, Senderoff SG, Carlson KE, McElvaney KD, Welch MJ
School of Chemical Sciences, University of Illinois, Urbana, IL, 61801
Fifth International Symposium of the Journal of Steroid Biochemistry, July 13-15, 1981, Puerta Vallarta, Jalisco, Mexico. Journal of Steroid Biochemistry 80 pp., 1981.

The presence of estrogen receptors in the majority of human breast tumors provides a mechanism for the selective localiza-

tion of a gamma emitting estrogen that might be used as a tumor imaging agent. We have prepared 16-bromoestradiol labeled with the gamma-emitting radionuclide bromine-77 at specific activities of 400-1000 Ci/mmole, and we have determined its tissue distributions and have compared it with that of 16 alpha (I-125)-iodoestradiol. Immature animals were injected iv with 5 uCI -16 (Br-771)-bromoestradiol and 2-3 uCi 16 alpha (I-125)-iodoestradiol. Both labeled estradiols showed selective receptor-mediated uptake by target tissues, confirmed by depression upon co-administration of 18 ug unlabeled estradiol. Uterus-to-blood ratios at 1 hr were 14.3 for the bromoestradiol and 14.8 for the iodoestradiol; the ratios at 3 hr were 24.0 and 25.5, and those at 6 hr were 15.2 and 13.1. While uptake ratios vary significantly between animals, comparisons of the ratio for the bromoestradiol to that for the iodoestradiol in a given animal are very consistent. The ratios of the uterus -to-blood ratio for bromoestradiol to that of iodoestradiol are 1.02 at 1 hr, 1.06 at 3 hr and 1.23 at 6 hr. In mature rats, mammary tumors induced by dimethylbenz(a)anthracene can be imaged using 16 alpha (Br-77)-bromoestradiol. (no Refs)

65. UPTAKE OF 57CO-BLEOMYCIN IN TRANSPLANTED RAT TUMORS FOLLOWING LOCAL HYPERTHERMIA (MEETING ABSTRACT).

Lin PS, Cariani P, Kahn PC
Department of Therapeutic Radiology, Tufts-New-England Medical Center, 171 Harrison Avenue, Boston, MA, 02111
Strahlentherapie; 157(9):620 1981

In vitro studies have shown that heat can greatly enhance bleomycin cytotoxicity. Recent data from these studies suggest that the order of treatment with bleomycin and heat is important , and that heat followed by bleomycin appears to be more effective. However, in vivo may alter tumor blood-flow characteristics, conceivably changing the pharmacokinetics of bleomycin, thereby affecting the treatment effectiveness. To test this possibility, we first heated rat rhabdomyosarcoma (BA 1112) transplanted onto the scalps of WAG/Rij rats. Tumors were maintained at 43 C for 60-90 min using a 1.3 MHz RF current. Immediately, or 24 hr later, rats were injected iv or ip with 57Co-bleomycin. Rats were then immediately imaged on an Ohio nuclear Sigma-400 radioisotope camera and followed for 120 min. Tumor-to-background ratios were determined for each group of rats and compared. Our results indicate that (1) local hyperthermia (43 C) does not appear to alter tumor uptake of 57Co-bleomycin relative to other tissues, (2) that iv and ip injection produces similar uptake ratio, typically between 2 and 3 at 120 min post injection. Thus, in the BA 1112/ WAG/Rij tumor system, prior local hyperthermia treatment does not seem to interfere with the subsequent accumulation of bleomycin in the tumor. (no Refs)

66. AN INVESTIGATION OF THE MECHANISM OF CIS-DIAMMINE DICHLOROPLATINUM INTERFERENCE WITH RADIO GALLIUM UPTAKE IN TUMOURS (MEETING ABSTRACT).

Noujaim AA, Turner CJ, Van Niewwenhuyze BM, Terner U, Lentle BC
Faculty of Pharmacy, University of Alberta, Edmonton, Alberta, Canada
Aust NZ J Med; 11(4):437 1981

It has been noted that cis-diammine dichloroplatinum (Cis-Pt) interferes with the clinical tumor imaging using 67 Ga-citrate. A series of experiments were conducted both in vitro using a human malignant melanoma cell culture, and in vivo using a canine transmissible veneral tumor to elucidate the mechanism by which this interference takes place. Additional experiments were performed to establish the role of transferrin in uptake of gallium by tumors as influenced by Cis-Pt. Results from in vivo experiments indicate that the administration of Cis-Pt resulted in a decreased tumor uptake of both Ga-transferrin complex and Ga-citrate. The observed effect is delayed until one wk after administration of the chemotherapeutic agent with no immediate detectable interference from Cis-Pt. In vitro results also confirm in vivo observations that increasing amounts of Cis-Pt effect a considerable decrease of Ga uptake either from the citrate or transferrin forms. In the binding to transferrin, essentially no competition appeared to be present between Cis-Pt and gallium. Results of this investigation suggest that the mechanism of Cis-Pt interference in radio gallium uptake is basically at a cellular level rather than in transport. This has implications in the clinical interpretation of gallium images. (no Refs)

67. SELECTIVE MELANOMA SEEKERS (MEETING ABSTRACT).

Olander K, Dencker L, Larsson B, Ullberg S
Department of Toxicology, University of Uppsala, Uppsala, Sweden
W.H.O. Seminar on Malignant Melanoma, June 24, 1981, Gothenburg, Sweden. World Health Organization 35 pp., 1981.

It is known that several drugs, mainly polycyclic amines, are bound to melanin-containing tissues. They are adsorbed to the mature melanin chiefly by electrostatic attraction. There is however an entirely different type of binding. We have found that a few substances, eg thiouracil, thiourea and methimazole, are incorporated into the melanin during its synthesis, apparently acting as false precursors. Blocking of the sulfhydryl group or removal of the sulfur atom of thiouracil presents this incorporation, indicating that the firm binding between these false precursors and the melanin constitutes a condensation of the sulfhydryl group with the quinones, which are reactive intermediates in the melanin synthesis. These drugs do not adsorb to preformed melanin, which makes them specific indicators of the melanin synthesis and thus also selective melanoma seekers. To be clinically useful, they have to be tagged with a suitable radionuclide emitting gamma-radiaton for diagnosis and energetic beta-radiation for tumor therapy. Iodine-131 would fulfill these requirements. Therefore we have labelled thiouracil with iodine. Studies of the distribution of this substance in melanoma-bearing mice is going on and preliminary results show a high and selective accumulation in the tumors. (no Refs)

REVIEWS

68. TUMOR LOCALIZATION WITH GALLIUM, RADIOLABELED BLEOMYCIN, THALLIUM, SELENIUM, CARBON AND NITROGEN RADIONUCLIDES (ONCOLOGY OVERVIEW).

International Cancer Research Data Bank
NCI, Westwood Building, Room 10A18, Bethesda, MD, 20205
Tumor Localization with Gallium, Radiolabeled Bleomycin, Thallium, Selenium, Carbon and Nitrogen Radionuclides (Oncology Overview) Haynie, T P, ed This Title is Available Through National Technical Information Service, Springfield, VA, as NTISUB/P81-922807:; OT-81/07:78pp. 1981

ONCOLOGY OVERVIEW is a service of the International Cancer Research Data Bank (ICRDB) Program of the Nation-

al Cancer Institute. Retrospective bibliographies containing 100-500 selected abstracts of published research on topics of high interest to cancer investigators are presented. The scope of this OVERVIEW covers basic research, methodology, techniques, and clinical applications of tumor localizing agents in the diagnosis of cancer. Included are abstracts on the use of these agents in detecting tumors of the breast, central nervous system, thyroid, adrenal, and other endocrine glands. Studies of the use of these agents in diagnosis of tumors of the gastrointestinal tract, genitourinary system, head and neck, and lungs have also been included. In addition, gynecologic tumors, lymphomas, leukemias, myeloma, and musculoskele tal tumors have been covered.

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APRIL, 1982

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BREAST NEOPLASMS

1. MAMMARY LYMPHATIC SCINTISCANS BY INTRATUMORAL INJECTION IN THE ASSESSMENT OF BREAST CANCER: 105 EXAMINATIONS IN 100 PATIENTS.

Gabelle P, Comet M, Bodin JP, Dupre A, Carpentier E, Bolla M, Swiercz P
Service de Chirurgie Generale et Digestive, C.H.U., Hopital des Sablons, F 38043 Grenoble Cedex, France
Nouv Presse Med; 10(37):3067-3070 1981

One hundred and five scintiscans of the mammary lymphatic system were performed in 100 patients with breast cancer by intratumoral injection of 99 m Tc-labeled colloidal rhenium. The progr ession of the radioactive colloidal agent was followed on a series of films taken 1, 2, and 4 hr after the injection, and the images obtained were compared with postoperative findings of lymph node involvement. Patients with more than three carcinomatous lymph nodes had less than two foci of activity, while those with less than three carcinomatous lymph nodes had more than two foci of activity, owing to more rapid progression of the compound. The difference was highly significant (p less than 0.001). (Author abstract) (12 Refs) (In FRE)

2. CONSIDERATIONS OF 1,000 SKELETAL SCINTIGRAMS PERFORMED IN MAMMARY CANCER PATIENTS.

Serafini D, Salvo d, Soliani Raschini C, Troiso A
I Servizio di Radiologia, Arcispedale S. Maria Nuova, Reggio Emilia, Italy
Radiol Med (Torino); 67(11):895-897 1981

The results of 1,000 skeletal scintigrams performed on mammary cancer patients were positive in 11.1% of Stage I and II, and in 61.9% of Stage III and IV. Scintigraphy is considered a very simple and useful method for early diagnosis of mammary cancer metastases. Follow-up should be started 6 wk after mastectomy, repeated every 6 mo for 2 yr, and annually thereafter. (13 Refs) (In ITA)

CENTRAL NERVOUS SYSTEM NEOPLASMS

3. INTERNAL IRRADIATION FOR CYSTIC CRANIOPHARYNGIOMA.

Kobayashi T, Kageyama N, Ohara K
Dept. Neurosurgery, Nagoya Univ. Sch. Medicine, 65, Tsuruma-cho, Showa-ku, Nagoya, Japan
J Neurosurg; 55(6):896-903 1981

The authors report the results of internal irradiation with labeled chromic phosphate (32P) and gold-198 (198Au) colloid in eight cases of cystic craniopharyngiomas. They used a newly developed dosimetric formula, by which the radiation dose at the cyst wall and at any point far from the radioactive source can be calculated. Ten courses of irradiation in eight patients were carried out by injection of either 32P or 198Au colloid into the cyst through an Ommaya drainage system that had been placed at craniotomy. Follow-up studies ranging from 13 to 156 mo revealed that all cysts were effectively treated, with elimination of fluid or collapse of the cyst. This was confirmed by Conray cystography and/or computerized tomography. Not only the dose delivered to the wall but also the thickness of the cyst wall and the location of the cyst are important factors in planning internal irradiation. A safe and adequate dose to the cyst wall could range between 9,000 to 30,000 rads for craniopharyngioma. This treatment is suitable for large cysts that are thought to be difficult to remove radically, recurrent cysts resistant to previous treatment, or multiple cysts. Internal irradiation may also be applicable in other cystic intracranial tumors if dosimetry is calculated accurately. (Author abstract) (19 Refs)

DIGESTIVE NEOPLASMS

4. CLINICAL EVALUATION OF BONE METASTASES FROM CARCINOMA OF THE DIGESTIVE SYSTEM BY SCINTIGRAPHY WITH 99MTC-PHOSPHOROUS COMPOUNDS.

Bussaka H, Fujimura N
Dept. Radiology, Kumamoto Univ. Sch. Medicine, Honjo, Kumamoto 860, Japan
Kaku Igaku; 18(5):591-599 1981

Bone scintigraphy with 99mTc-phosphorous compounds was performed on 105 patients with carcinoma of the digestive system. Thirty-two of the patients (30%) had bone metastases. The incidence of these bone metastases was as follows: 14% (4/28) of the patients with carcinoma of the esophagus, 38% (12/32) of those with carcinoma of the stomach, 27% (6/22) with carcinoma of the colon, 67% (6/9) with carcinoma of the liver, 14% (1/7) with carcinoma of the gallbladder and bile duct, and 43% (3/7) with carcinoma of the pancreas. Previous reports stated that liver metastases are found frequently and early, lung metastases seldom and late, and bone metastases rarely. In our study, however, liver and lung metastases were not found in 12 patients with bone metastases from carcinoma of the esophagus, stomach, colon, gallbladder, and pancreas. Two patients with carcinoma of the liver with bone metastases revealed no lung metastases. Therefore, if bone metastases are suspected, bone scintigraphy should be performed on patients with carcinoma of the digestive system with or without liver and lung metastases, especially on patients with carcinoma of the colon because of the significance of the vertebral venous plexus as the metastatic route. Prognosis of carcinoma of the digestive system with bone metastases was poor; the av survival period was 3.5 mo. Symptoms, alkaline phosphatase activity, roentgenographic findings, and histological findings of the primary focus of the digestive tract are discussed. (Author abstract) (23 Refs) (In JPN)

5. 99MTC RED BLOOD CELLS FOR DETECTION OF GASTROINTESTINAL BLEEDING: EXPERIENCE WITH 80 PATIENTS.

McKusick KA, Froelich J, Callahan RJ, Winzelberg GG, Strauss HW
Nuclear Medicine Div., Massachusetts General Hosp., Boston, MA, 02114
AJR; 137(6):1113-1118 1981

Imaging was done in 80 patients with gastrointestinal hemorrhage using red blood cells labeled with 99mTc by a modified in vivo technique. Bleeding was detected in 65% of 40 patients with bright red blood per rectum, 71% of 35 patients with melena, and in none of the five patients with occult bleeding and chronic anemia. No clinical evidence of further gastrointestinal hemorrhage occurred in 26 of the 29 patients who

were negative on imaging. The imaging study could be carried out for over 24 hr which increased the sensitivity of the test, since only 16% of the studies were abnormal on the initial images. Neither the need for blood replacement nor the presence of bright red blood per rectum correlated strongly with early image positivity, supporting the contention that patients with gastrointestinal hemorrhage do not necessarily bleed continuously. Labeled red cell imaging was more sensitive in the detection of bleeding than angiography. It corresponded to the overall angiographic findings in 23 of 31 cases and in 17 of the 18 patients who had demonstrable extravasation. 99mTc red blood cells may be used effectively in patients with melena as well as with bright red blood per rectum, and thus would seem to be the preferred radiopharmaceutical for imaging. (Author abstract) (8 Refs)

6. LIVER SCANNING USING INDIUM-113M AT THE UNIVERSITY TEACHING HOSPITAL, LUSAKA, ZAMBIA.

Mulaisho C, Mumba KN
Nuclear Medicine Unit, Dept. Medicine, Univ. Zambia, Lusaka, Zambia
S Afr Med J; 60(21):812-814 1981

Liver scanning, using the radio-isotope indium-113m (113mIn), can now be routinely performed at the University Teaching Hospital, Lusaka, Zambia. The dose used is 1-4 mCi. Liver scans have been performed on 48 subjects, including 10 healthy individuals, 16 patients with histologically proven hepatocellular carcinoma, 11 with clinical and laboratory evidence of portal hypertension and 11 with miscellaneous illnesses. Seven representative scans are illustrated. The procedure is easy, and gives a fairly accurate functional estimate of Kupffer cell mass. In hepatoma, the scan may be either larger than or smaller than normal and reflects more accurately the residual function of the Kupffer cells. In cirrhosis of the liver with portal hypertension, residual Kupffer cell mass is small. Consequently, most of the 113mIn is taken up by the splenic reticuloendothelial system, resulting in a large spleen scan. This technique, although fraught with major limitations, is a useful additional diagnostic tool in the management of chronic liver disease. (Author abstract) (4 Refs)

ENDOCRINE NEOPLASMS

7. THE COMPARATIVE VALUE OF SERUM THYROGLOBULIN MEASUREMENTS AND IODINE 131 TOTAL BODY SCANS IN THE FOLLOW-UP STUDY OF PATIENTS WITH TREATED DIFFERENTIATED THYROID CANCER.

Ashcraft MW, Van Herle AJ
(c/o Van Herle) Dept. Medicine, Div. Endocrinology, UCLA Sch. Medicine, Los Angeles, CA, 90024
Am J Med; 71(5):806-814 1981

This study is an attempt to unify the evaluation of patients with well-differentiated thyroid cancer after ablative therapy. As such, serum thyroglobulin determinations on and off thyroid hormone (T4) therapy and iodine 131 total body scans were examined in 53 patient studies. No metastases were found in patients whose thyroglobulin value was undetectable (less than 1 ng/ml). Values during T4 therapy that were detectable, even as low s 4.2 ng/ml, were occasionally associated with metastases. After T4 withdrawal, thyroglobulin value and scan were obtained. Neither metastasis nor clinically detectable cancer was found in patients whose thyroglobulin value was less than 10 ng/ml while off T4. Conversely, a value gre ater than 10 ng/ml was often associated with documented metastases even when the scan was negative. In summary, a thyroglobulin value less than 1 ng/ml during T4 therapy or less than 10 ng/ml off T4 therapy suggests successful therapy and a routine scan could be avoided unless clinically indicated. However, a value greater than 10 ng/ml suggests the presence of metastasis despite a negative scan. Thyroglobulin determination substantially improves the management of these patients. (Author abstract) (45 Refs)

8. COMPREHENSIVE RADIONUCLIDE EXAMINATION OF THE FUNCTIONAL STATE OF THE HYPOPHYSEAL-THYROID SYSTEM IN TOXIC THYROID ADENOMAS.

Kashkadamov AV
Res. Inst. Endocrinology and Metabolism, Kiev, USSR
Med Radiol (Mosk); 26(10):40-43 1981

Functional state of the hypophyseal-thyroid system was studied in 21 patients (30-60 yr old) who had toxic thyroid adenoma. Scintigraphy with the use of 131I failed to differentiate between the patients with clinical symptoms of thyrotoxicosis and those without. Radioimmunoassay of thyroid hormones showed, however, significant increases in blood levels of thyrotropin, triiodothyronine, and thyroxine in the patients with the clinical symptoms. (17 Refs) (In RUS)

9. COMPUTED TOMOGRAPHY AND SCINTIGRAPHY IN THE EVALUATION OF PATIENTS WITH MYASTHENIA GRAVIS.

Fiore D, Biondetti PR, Ravasini R, Camposanpiero A, D'Amico D, Bassi N
Istituto di Radiologia, Universita di Padova, Via Giustiniani, 2, 35100 Padova, Italy
Radiol Med (Torino); 67(11):809-814 1981

The role of computed tomography (CT) and scintigraphy (SG) in the diagnosis of 14 myasthenia gravis patients (11 women and 3 men, 16-74 yr old) was investigated. All patients had plain chest radiography (R), conventional tomography (Con T), CT, and SG. In cases that did not show clear vascularization, contrast medium was used. SG was performed 24, 48, and 72 hr after administration of 2.5-3.5 uCi/kg of 75Se-selenium-methionine. Only seven patients had total thymectomy. R and Con T indicated tumor in only one case. SG showed seven possible thymomas, one thymic mass, four probable hyperplasias, with two negative findings. CT indicated three thymomas, five hyperplasias with six negative results. Histological examination following surgery indicated one benign lymphocyte thymoma, one malignant lymphoepithelial thymoma, four hyperplasias, and one normal, but hypertrophic thymus. (20 Refs) (In ITA)

GENITOURINARY NEOPLASMS

10. CARCINOMA OF THE PROSTATE: THE TREATMENT OF BONE METASTASES BY RADIOPHOSPHORUS.

Glaser MG, Howard N, Waterfall N

Dept. Radiotherapy and Surgery, Charing Cross Hosp., London, England

Clin Radiol; 32(6):695-697 1981

Osseous deposits secondary to advanced carcinoma of the prostate are a common feature of the disease. These deposits are most often seen in the lumbar spine and pelvis and cause severe and intractable pain, often requiring large quantities of strong analgesia for alleviation of pain. Relief of pain can be achieved by external irradiation of these deposits, but this relief may not be permanent and the disease may be so widespread that it is impracticable to treat all the deposits by irradiation. Deposits from carcinoma of the prostate are usually multiple and all may cause pain at the same time. A method of delivering the radiation to all the deposits at the same time has been sought. Previous studies have shown that radioactive phosphorus (P32) can be used to obtain this localization of radioactivity at sites of osseous activity. In this study 24 patients with bone metastases from carcinoma of the prostate were treated with radiophosphorus and methyl testosterone, or radiophosphorus with parathormone and calcium. An overall response rate of 58% shows this to be an effective palliative treatment. The results suggest there is a greater response when P32 is used in conjunction with parathormone and calcium, than with methyl testosterone. (Author abstract) (5 Refs)

GYNECOLOGIC NEOPLASMS

11. RADIONUCLIDE LIVER AND BONE SCANNING IN THE EVALUATION OF PATIENTS WITH ENDOMETRIAL CARCINOMA.

Mettler FA, Christie JH, Garcia JF, Baldwin MH, Wicks JD, Bartow SA

Div. Nuclear Medicine, Dept. Radiology, Univ. New Mexico Hosp., Albuquerque, NM, 87131

Radiology; 141(3,part1):777-780 1981

Staging bone scans or skeletal surveys were obtained of 97 patients with endometrial carcinoma. Of the 77 patients with Stage I or II disease, no metastases were identified at staging. Three patients in the entire series demonstrated bony metastases; all of these metastases were detectable by radionuclide bone scan and radiographic bone survey. Eighty-nine patients were examined with radionuclide liver/spleen scanning at the time of staging. Four of the 89 initial scans were interpreted as demonstrating hepatocellular disease, and all four patients had abnormal liver function studies. Only one patient demonstrated a possible hepatic metastasis at initial diagnosis. This patient also had abnormal liver function studies. Based on these results, bone surveys and radionuclide bone scans are not indicated as screening procedures in endometrial carcinoma. It is suggested that screening for liver metastases in patients with endometrial carcinoma is not warranted in patients with normal liver function studies. (Author abstract) (15 Refs)

12. USE OF 32P FOR RAPID DIAGNOSIS DURING GYNECOLOGICAL SURGERY.

Poral-Koshits KV

Dept. Obstetrics and Gynecology, N. I. Pirogov Second Medical Inst., Moscow, USSR

Akush Ginekol (Mosk); (9):45-47 1981

To evaluate the efficacy of radioisotope rapid diagnosis, a group of women with various uterine and ovarian diseases were administered 32P (80 uCi) 1 day prior to surgery. Intraoperative r adiometry showed significant accumulation of radioisotope in malignant tumors, while accumulation in benign tumors was similar to that in normal tissues. (6 Refs) (In RUS)

HEAD AND NECK NEOPLASMS

13. COMPLEX DIAGNOSIS OF LARYNGEAL CANCER.

Seniukov MV, Kulikov VA, Matveenko EG, Drozdovskaia MI, Prikhod'ko AG

Res. Inst. Medical Radiology, Obninsk, USSR

Zh Ushn Nos Gorl Bolezn; (5):54-58 1981

Diagnostic efficacy of larynx scintigraphy and contrast laryngography was evaluated in 186 laryngeal cancer patients and 14 chronic laryngitis patients. Among cancer patients, 7 had Stage I, 31 had Stage II, 118 had Stage III, and 30 had Stage IV. Scintigraphy with 75Se-selenomethionine provided correct diagnosis in 82.5% of the patients. Radionuclide imaging was effective in the patients with clinical diagnosis of cancer of the larynx and negative histological findings. Scintigraphy visualized only relatively large (greater than 1.5-2 cm in diameter) tumors. Contrast laryngography provided detailed information on the type and extent of tumor dissemination. Contrast laryngography was especially effective in the patients with small (3-5 mm) exophytic tumors. (5 Refs) (In RUS)

HEMATOLOGIC, RETICULOENDOTHELIAL, AND LYMPHATIC NEOPLASMS

14. WHOLE BODY BONE SCINTIGRAPHY COMPARED TO CONVENTIONAL RADIOGRAPHY IN DETECTING BONE LESIONS IN MULTIPLE MYELOMA.

Deding A, Ingeberg S, Jorgensen PS

Medical Dept. BN, Aalborg Hosp., DK-9000 Aalborg, Denmark

Dan Med Bull; 28(5):207-209 1981

In a consecutive series of 30 patients with multiple myeloma, whole body scan with 99mTechnetium methylenediphosphonate and radiographic skeletal survey were performed The skeleton was divided into 29 bone regions; the positive regions, ie, those with increased uptake on scan and typical myelomatous lesions on x-ray, were registered and the results of the two investigations compared. Two hundred and twenty-six bone regions were positive on x-ray and/or scan, 159 (70%) on x-ray only, 26 (12%) on scan only and 41 (18%) on both x-ray and scan. None of the patients had bone lesions which were only demonstrated on scan. Almost all regions with bone pain were positive on both x-ray and scan. The results indicate that whole body bone scintigraphy is considerably less sensitive than conventional radiography in detecting myelomatous bone lesions, and of little use as a screening pro-

cedure for determining the extent of bone involvement. (Author abstract) (15 Refs)

15. CYSTIC LYMPHANGIOMATOSIS OF THE SPLEEN: A RADIOLOGIC-PATHOLOGIC CORRELATION.

Rao BK, AuBuchon J, Lieberman LM, Polcyn RE
Radiology Dept., Nuclear Medicine Section, Univ. Hosp. Clinics, 600 Highland Ave., Madison, WI, 53792
Radiology; 141(3,part1):781-782 1981

Cystic lymphangiomatosis of the spleen is an extremely rare pathologic entity. W e report the radiologic, sonographic, and scintigraphic findings in two cases of splenic cystic lymphangiomatosis. In both patients echograms demonstrated multiloculated cystic lesions in the intra-abdominal masses, which were identified on radiocolloid scans as abnormal spleens. The gross and microscopic findings of the excised spleens were characteristic of cystic lymphangiomatosis. The findings on echograms and scintigrams correlated well with the abnormal splenic morphology. The clinical presentation, the findings on diagnostic imaging, and the gross and microscopic appearances of the pathologic spleens in our patients were remarkably similar. When a massively enlarged spleen with a multicystic appearance is encountered during a diagnostic workup, awareness of the scintiscan and sonographic findings might aid in the noninvasive preoperative recognition of cystic lymphangiomatosis. (Author abstract) (13 Refs)

16. THE ASSOCIATION OF LYMPH NODES SCINTIGRAPHY WITH 99TCM-SULFUR-MICROCOLLOID AND SONOGRAPHY SCAN IN STAGE DIAGNOSIS OF LYMPHOMAS.

Giubbini R, Bettini R, Casucci R, Garancini S, Magistretti G, Roncari G
Servizio di Medicina Nucleare, Spedali Civili, 25100 Brescia, Italy
Radiol Med (Torino); 67(11):823-827 1981

Thirty-seven patients (16 with Hodgkin's disease, 21 with non-Hodgkin's disease) were studied using indirect scintigraphy (IS) with 99Tcm-sulfur-microcolloid and sonography to evaluate the diagnostic sensitivity of the two methods. IS demonstrated a high sensitivity and a low specificity and was clinically valuable if negative. S had a low sensitivity and a high specificity and was clinically valuable if positive. Sensitivity, specificity and accuracy results for IS were 82%, 80% and 81%, and for S were 59%, 100%, and 81%, respectively. Both methods, especially if associated, were useful in restaging after therapy, where parameters included low risk and stress for the patients, easy execution and low costs. (11 Refs) (In ITA)

17. METHODS OF NUCLEAR MEDICINE AND LABORATORY TECHNIQUES IN HODGKIN'S DISEASE.

Dienstbier Z, Samal M, Foltynova V, Bechyne M, Koprivova H
Ustav biofyziky a nuklearni mediciny, Fakulta Vseobecneho Lekarstvi University Karlovy, Kladenska 28, 160 00 Prague 6, Czechoslovakia
Cas Lek Cesk; 120(39):1187-1189 1981

Results of a 10-yr testing of selected radiological, hematological, biochemical, and immunological methods in the diagnosis and follow-up of Hodgkin's disease are summarized. Scintigraphy with 67Ga, radioisotope lymphography, and bone scintigraphy were found to be particularly significant for clinical staging and for the diagnosis of recurrences. Increased erythrocyte sedimentation rate, decreased hematocrit level, and increased serum alkaline phosphatase activity were found important for clinical classification. Generalization of the process was evidenced by leukocytosis, increased serum aminotransferase and lactate dehydrogenase activities, reduced albumin-globulin ratio, and high alpha-1, alpha-2 and gamma-globulin levels. Hematological and biochemical tests facilitated the diagnosis of recurrence. Simple immunological tests (immunoglobulin determination and differentiation of lymphocyte nucleoli) proved to be valuable supplements to other laboratory tests. Persistently increased spontaneous lymphocyte activity was indicative of continuing antigenic stimulation of the immune system. (13 Refs) (In CZE)

MUSCULOSKELETAL NEOPLASMS

18. CLINICAL EVALUATION OF 133MBA AS A BONE-SEEKING AGENT.

Korsunskii VN, Tarasov NF, Naumenko AZ
No affiliation given
Med Radiol (Mosk); 26(10):45-48 1981

The efficacy of 133mBa for radionuclide imaging of bone was studied in six cancer patients (4 had breast cancer, 1 had prostatic cancer, and 1 had osteogenic sarcoma of the femur). Disadvantages of the radionuclide consisted of significant accumulation of the material (20-68%) in the large intestine and insufficient accuracy of dosimetry. (4 Refs) (In RUS)

19. BONE SCANNING IN METABOLIC BONE DISEASE.

Fogelman I, Citrin DL
Glasgow Royal Infirmary, Glasgow, Scotland
Appl Radiol; 10(6):158-162,164-166 1981

Etiology, roentgenographic findings, and clinical features of the major metabolic bone diseases (MBD) are reviewed. Osteoporosis, osteomalacia, hyperparathyroidism, and renal osteodystrophy are discussed. Thw exact mechanism of skeletal uptake of 99mTc (technetium)-labeled phosphate and diphosphonate compounds is still incompletely understood. Bone turnover is increases significantly in MBD; the bone scan (BS) will demonstrate increased activity. Abnormal BS patterns particularly common in MBD are discussed and illustrated. Scanning can be valuable in screening for presence of MBD, assessing the severity of known disease, and following the effects of therapy. BS is more sensitive in diagnosis of renal osteodystrophy and osteomalacia than of other MBD; BS abnormalities correlate with severity of disease. Serial BS can be used for following the effects of therapy due to the low radiation dose and lack of pharmaceutical toxicity. (52 Refs)

RESPIRATORY AND CARDIOVASCULAR NEOPLASMS

20. DISAPPEARANCE OF SOFT TISSUE 99MTC DIPHOSPHONATE ACTIVITY FOLLOWING RADIATION THERAPY.

Hill LT
Dept. Radiation Medicine, Georgetown Univ. Medical Center, 3800 Reservoir Road, NW, Washington, DC, 20007
J Natl Med Assoc; 73(12):1119-1121 1981

The appearance of soft tissue concentrations of technetium labeled phosphate compounds has been observed in a variety

of pathological conditions. The mechanism and pathophysiology of this phenomenon remain unclear. Seven new patients diagnosed with lung cancer received 99mTc diphosphonate bone scans during the period of January 1975 to November 1975. Three of the seven subjects showed a significant accumulation of isotope in the region of the chest infiltrate at the time of diagnosis. Upon repeat technetium bone scans 6 mo post radiation, two patients showed a sharp reduction in the soft tissue activity previously observed. The material is presented and a possible explanation of this phenomenon is offered. (Author abstract) (14 Refs)

SELECTED PRE-CLINICAL STUDIES

21. ALTERATION OF GALLIUM-67 DISTRIBUTION IN TUMOR-BEARING MICE FOLLOWING TREATMENT WITH METHOTREXATE: CONCISE COMMUNICATION.

Chilton HM, Witcofski RL, Watson NE, Heise CM
(c/o Witcofski) Dept. Radiology, Bowman Gray Sch. Medicine, 300 S. Hawthorne Road, Winston-Salem, NC, 27103
J Nucl Med; 22(12):1064-1068 1981

The effect of methotrexate (MTX) treatment upon Ga-67 distribution was investigated. Tumor bearing mice were injected with Ga-67 citrate at varying time intervals following MTX treatment administered either as a single dose or in multiple doses. Altered Ga-67 distribution was observed following MTX therapy, the general pattern showing decreased levels in blood and increased uptake in bone. MTX therapy decreased Ga-67 uptake in liver, tumor, and muscle. The effects of MTX are related to the dose and time interval between the administrations of MTX and Ga-67. The serum of MTX-treated mice had lower unsaturated iron binding capacities and higher levels of unbound Ga-67. Serum iron and iron binding in rats determined 20 hr after MTX therapy showed significantly higher levels of serum iron and lower levels of Ga-67 in blood, and the percent transferrin saturation was approximately 95%. These observations suggest that MTX inhibition of erythropoiesis elevates serum iron levels and decreases the availability of gallium-binding sites in serum, resulting in altered Ga-67 tissue distribution. (Author abstract) (19 Refs)

22. TUMOR VISUALIZATION BY 99MTC-LABELED ETHYLENEDIAMINE-N,N-DIACETIC ACID.

Karube Y, Maeda T, Ohya M, Kono A
Kyushu Cancer Center, Notame, Minami-ku, Fukuoka 815, Japan
Chem Pharm Bull (Tokyo); 29(8):2385-2387 1981

The use of 99m-technetium (99mTc)-labeled ethylenediamine-N,N-diacetic acid (EDDA) for tumor visualization is described. 99mTc EDDA (0.1 ml, 500 uCi) was injected iv into male mice 3 wk after implantation of an Ehrlich ascites tumor. Five hr after injection, organs, blood, some muscle, and the tumor were removed and weighed; radioactivity was measured. High uptake of radioactivity by the tumor and kidneys was noted. 99mTc EDDA gave satisfactory scintigraphic visualization of Ehrlich ascites tumors. (3 Refs)

REVIEWS

23. CLINICAL APPLICATIONS OF SHORT-LIFE NUCLEAR PARTICLES AND CYCLOTRON NUCLEAR MEDICINE.

Suehiro M, Toyama H, Iio M
Dept. Medical Radiology, Tokyo Orphanage Affilitated Hosp., 35-2 Yocho, Iidabashi-ku, Tokyo 173, Japan
Nippon Rinsho; 39(3):157-169 1981

Specifications of short-life positron emitter apparatus, their problems, and their clinical application, problems and primary clinical applications of labeled compounds, and types and specifications of cyclotron apparatuses in use throughout the world were discussed. Positron emitter labeled compounds included those used in studies of breathing and gases, phospholipids, amino acids, glucose and deoxyglucose, ligands for delineating receptors, and 68Ga-labelled compounds. (45 Refs) (In JPN)

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BREAST NEOPLASMS

1. BONE SCINTIGRAPHY: METHOD OF CHOICE IN STAGING OF MAMMARY CARCINOMA.

Oliveri P, Degrossi OJ, Zurell A, Garcia del Rio H, Artagaveytia D, De Goncalves MO

Servicios de Medicina Nuclear y de Ginecologia y Obstetricia, Hospital Aleman, Buenos Aires, Argentina

Prensa Med Argent; 68(12):491-494 1981

Results obtained by total osseous scintigraphy (Sc) in 141 patients (28-83 yr old) with breast carcinoma are analyzed. Twenty-nine patients had Sc before treatment and 112 had Sc 6 mo to 18 yr after treatment. Of the 112 patients, 108 had surgery which in most cases was followed by radiotherapy (59% also had surgical or actinic castration and 16% had chemotherapy and hormone therapy); 4 patients received radiotherapy followed by chemotherapy and hormone therapy. Pathological examination was performed on surgical and biopsy material. Of the 29 patients who had Sc before treatment, results were positive in 17 and negative in 12. Of the 108 patients treated surgically, 66% had positive Sc test results; only 54.2% of the patients had positive results 1 yr after surgery, but after 5 yr the Sc test was positive in 76%. The four patients who did not receive surgery had positive Sc tests 3-8 yr later. (22 Refs) (In SPA)

2. RADIOGRAPHIC EVALUATION OF THERAPEUTIC RESPONSE IN BONY METASTASES OF BREAST CANCER.

Libshitz HI, Hortobagyi GN

Dept. Diagnostic Radiology, Univ. Texas System Cancer Center, M. D. Anderson Hosp. and Tumor Inst., 6723 Bertner Ave., Houston, TX, 77030

Skeletal Radiol; 7(3):159-165 1981

Radiographic appearance of response to chemotherapy was investigated in 50 previously untreated breast cancer patients (29-69 yr old) with known metastases in bone. Chemotherapy programs consisted of 5-fluorouracil, adriamycin, cyclophosphamide and methotrexate, or equivalents. Pretreatment evaluation of radiographs revealed osseous metastases in 44 classified as follows: lytic (26),, mixed (11), blastic (4), and fracture (3). Lytic metastases showed response in a definite sequence: sclerotic rim, filling in, uniformly blastic, and uniform fading. Disease progression was indicated by increase in the size of lytic areas or destruction in previously responding areas. Mixed lesions initially show a rim of sclerosis. Further response is similar to lytic lesions. Healing in blastic lesions, while difficult to evaluate, was indicated by fading of the blastic response to a normal bony density and trabecular pattern. Disease progression was indicated by increasing areas of blastic change or the development of destruction within a blastic lesion. Sixteen of 26 patients with lytic metastases showed no response, stayed stable less than 12 mo, or responded less than 12 mo to chemotherapy. Ten patients remained stable or responded greater than 12 mo. Twelve of 15 patients with mixed or blastic metastases responded to therapy of 12 mo or longer. Evaluation of metastases in bone should include bone scan, radiographs, and clinical history. (15 Refs)

CENTRAL NERVOUS SYSTEM NEOPLASMS

3. ASSESSMENT OF THE VALUE OF BRAIN SCINTIGRAPHY ON THE BASIS OF A ONE-YEAR SERIES OF 508 INPATIENTS.

Nielsen PE

Rontgenafdelingen, Viborg sygehus Vest, Hedeskraenten 39, DK-8800 Viborg, Denmark

Ugeskr Laeger; 143(47):3123-3126 1981

Five hundred and fifty brain scintigraphic examinations were performed in 508 inpatients. The ultimate diagnosis and that of cerebral neoplasm in 31 patients. Cerebral neoplasm was correctly diagnosed primarily by scintigraphy in 24/31 patients. The scintigraphic findings were primarily positive in 1/1 patient with acoustic nerve neurinoma, in 1/2 patients with astrocytomas, in 3/3 with benign meningiomas, in 1/1 with craniopharyngioma, in 3/4 with glioblastomas, in 5/5 with malignant gliomas, in 1/1 with sarcoma, in 6/8 with cerebral metastases, and in 3/6 patients with nonclassified types of malignant neoplasm. It was not possible to differentiate between a tumorous process and thromboembolic infarction with certainty, but repeated scintigraphic examinations in the course of the disease increased the diagnostic certainty. (15 Refs) (In DAN)

4. THE PREDICTIVE VALUE OF SERIAL SCINTIGRAPHY AND COMPUTERIZED TOMOGRAPHY IN THE DIAGNOSIS OF BRAIN LESIONS.

Tarolo GL, Zerbi D, Picozzi R, Sardella M, Zatta G

Servizio di Medicina Nucleare, Ospedale Civile, Piazza Borella, 5, 21047 Saronno (Varese), Italy

Radiol Med (Torino); 67(12):971-975 1981

The predictive value of serial scintigraphy (SS) was compared with that of computed tomography (CT) in the diagnosis of cerebral lesions in 875 patients. CT was a superior method for diagnosis. SS is more economic and should be used for screening patients with cerebral lesions, especially in hospitals that do not have neurosurgical facilities. The number of patients requiring neurosurgery is small. Under such conditions, the predictive value of SS compared to CT is not very different; the number of patients that require CT is thus considerably reduced. (11 Refs) (In ITA)

5. TC-99M GLUCOHEPTONATE BRAIN SCINTIGRAPHY: A CLINICAL COMPARISON BETWEEN ONE- AND TWO-HOUR DELAYED IMAGES: CONCISE COMMUNICATION.

Fink-Bennett D, Uppal TK, Wesolowski DP

Nuclear Medicine Dept., William Beaumont Hosp., 3601 West 13 Mile, Royal Oak, MI, 48072

J Nucl Med; 23(1):17-19 1982

Sixteen patients with known cerebral disease had 1-and 2-hr delayed brain scans following iv injection of 15 mCi of technetium-99m glucoheptonate. No abnormalities were seen on the 2-hr images that were not detected on the 1-hr scan. There were two false negative scans. Of the 14 true positives, 10 were visualized equally well on the one- and two-hr delayed images, two were better seen on 2-hr images, and two were better on 1-hr scans. As no difference in lesion detection was found, consideration of reducing the post-dose delay time from 2 hr to 1 seems warranted. (Author abstract) (4 Refs)

DIGESTIVE NEOPLASMS

6. LIVER IMAGING AND DETECTION OF LIVER METASTASES WITH 99MTC-HIDA.

Schulze PJ, Stritzke P, Stolzenbach G
Dept. Diagnostic Radiology, Univ. Hamburg, Martinistrasse 52, D-2000 Hamburg 20, W. Germany
Nuklearmedizin; 20(5):214-219 1981

The scintigraphic imaging properties of 99mTc-N-(2,6-dimethylphenylcarbamoyl methyl)iminodiacetic acid (99mTc-HIDA) and Tc-sulphur- or tin-colloids for detection of liver metastases were compared in studies of 16 patients with a history or suspicion of malignancy. Cases included 12 with a history of breast cancer, 1 with suspected Hodgkin's disease, 1 with testicular teratocarcinoma, 1 with colonic carcinoma, and 1 with cutaneous metastases of unknown origin. Scintigrams were taken in each case using 99mTc-sulfur- or tin-colloids and 99mTc-HIDA. All radiopharmaceuticals were prepared according to package instructions and were injected as a bolus iv (4-5 mCi). Liver metastases were indicated in 4 cases and were confirmed by ultrasound or computerized tomography scans. Both colloidal compounds and 99mTc-HIDA demonstrated hepatic filling defects. Normal hepatic parenchymal activity patterns coincided for both types of compound. Disadvantages of 99mTc-HIDA included longer examination time, inability to detect spleen involvement or primary hepatic tumors, and possibly reduced detection of filling defects in additional projections obtained after a single injection of radiopharmceutical. (16 Refs)

7. CONCOMITANT HEPATIC RADIATION AND INTRAARTERIAL FLUORINATED PYRIMIDINE THERAPY: CORRELATION OF LIVER SCAN, LIVER FUNCTION TESTS, AND PLASMA CEA WITH TUMOR RESPONSE.

Lokich J, Kinsella T, Perri J, Malcolm A, Clouse M
Dept. Medicine, New England Deaconess Hosp., 185 Pilgrim Road, Boston, MA, 02215
Cancer; 48(12):2569-2574 1981

Sixteen patients with metastatic disease to the liver (12 colorectal and 4 unknown primary tumors) were treated in a pilot study of hepatic irradiation (2,500-3,000 rads in 10-12 fractions) delivered concomitantly with continuous short-term intraarterial infusion of 5-fluorouracil (1 g/d) or FUDR (0.5 mg/kg/d) via a percutaneously placed hepatic artery catheter. Abnormal liver function tests, including SGOT, LDH, and alkaline phosphatase, decreased in all patients by day 7-10 of treatment, and other metabolic factors, including serum cholesterol, calcium, albumin, phosphorous, and uric acid, also decreased, often to subnormal levels by termination of treatment (day 15-20). These chemical alterations did not correlate with tumor response in that the identical pattern was observed in responders (10 patients) as well as nonresponders (6 patients). Objective determinants of response were assessed by serial monitoring of plasma carcinoembryonic antigen (CEA) and liver scan. In 14 patients with elevated CEA levels, tumor response (9 patients), nonresponse (4 patients), and relapse (5 patients) was predicted and confirmed by sequential monitoring of CEA. In one patient, a paradoxical decrease in plasma CEA was associated with pr ogressive disease. The liver scan identified all responding patients but was difficult to quantitate and was delayed for months following subjective clinical response and changes in plasma CEA levels. (Author abstract) (17 Refs)

8. ULTRASOUND EXAMINATION AND CHOLESCINTIGRAPHY IN CHOLESTASIS.

Bondestam S, Taavitsainen M, Jappinen S, Korhola O
First Dept. Radiology, Meilans Sjukhus, SF-00290 Helsingfors 29, Finland
Acta Radiol [Diagn] (Stockh); 22(4):421-426 1981

The results of ultrasound, cholescintigraphy, and their combination, were analyzed in 57 patients with cholestasis. At ultrasound, the presence of an extrahepatic obstruction was correctly diagnosed in 13 and at cholescintigraphy in 14 of 18 cases. The correct diagnosis increased to 17 when the information was combined. In the 31 patients with intrahepatic disease, absence of extrahepatic obstruction was correctly predicted in 26 cases with either method alone, whereas the combined use yielded a correct result in 29. (Author abstract) (13 Refs)

9. RADIONUCLIDE IMAGING OF THE BILIARY TRACT.

Henry RE, Daly MJ
Nuclear Medicine Service, Veterans Admin. Medical Center, Tucson, AZ
CRC Crit Rev Diagn Imaging; 17(1):1-18 1981

Although I-31 Rose Bengal has been used for over 20 yr to evaluate liver function and to diagnose biliary obstruction, both the high photon energy of I-131 and the low administered activity required by dosimetric considerations often resulted in poor quality, nondiagnostic images. Recently considerable success has been achieved in attaching Technetium-99m to a variety of compounds which are excreted through the biliary tree. Pyridoxylidene glutamate and acetanilide iminodiacetic acids (IDA) have had extensive clinical trials, and the latter group have become the agents of choice. The side chains attached to the IDA drugs affect the kinetics of hepatic uptake and excretion. Tc-Hida (dimethyl) and Tc-Pipida (paraisopropyl) are the two most commonly used IDA drugs, although other derivatives are being evaluated. Application of hepatobiliary scintigraphy have become more diverse as experience is gained with the newest agents. In general, biliary scintigraphy may replace a more invasive test (eg, transhepatic cholangiography), a more dangerous one (eg, iv cholangiography), or complement/confirm the findings of other modalities (eg, ultrasound). A specific application of biliary scintigraphy that has gained wide acceptance is the diagnosis of acute cholecystitis by nonvisualization of the gall bladder in the appropriate clinical setting. Obstructive jaundice may be distinguished from hepatocellular disease in many patients including the pediatric group, even with bilirubin levels greater than 10 mg/100 cc. Variations in imaging technique, such as the iv administration of cholecystokinin, may aid in distinguishing acute from chronic cholecystitis in p atients with nonvisualization of the gall bladder on routine imaging. Calculating the 'ejection fraction' of the gall bladder after giving a secretagogue has been suggested as an aid in defining the syndrome of biliary dyskinesia. With newer, better radiopharmaceuticals on the horizon and with more clinical uses being discovered, the future of radionuclide imaging of the biliary tree seems assured. (Author abstract) (54 Refs)

10. HEPATOBILIARY IMAGING WITH TC-99M-IDA RADIOPHARMACEUTICALS.

Rosenthall L
Div. Nuclear Medicine, Montreal General Hosp., 1650 Cedar Ave., Montreal, H3G 1A4, Canada
Clin Nucl Med; 7(1):44-46 1982

Clinical applications of hepatobiliary imaging with Tc-99m iminodiacetic acid (Tc-99m-IDA) are reviewed. The radiotracer can be used for gallbladder imaging, differential diagnosis of jaundice, assessment of cholangiointestinal and gastroenteric anastomoses, and evaluation of hepatocellular function from the net liver histogram. (no Refs)

11. RELATIVE DECREASED SPLENIC UPTAKE OF TC-99M-SULFUR COLLOID IN PATIENTS WITH PANCREATIC CARCINOMA.

Tatum JL, Burke TS, Fratkin MJ, Sharpe AR, Goodrich JK
Virginia Commonwealth Univ., Medical Coll. Virginia, Box 1, MCV Station, Richmond, VA, 23298
Clin Nucl Med; 7(1):1-4 1982

Relative spleen/liver activity ratio was determined from posterior projection images using a photodensitometric method. Ratios from scans of 22 patients with proven pancreatic carcinoma (12 from rectilinear scans and 10 from scintillation camera images) were determined and compared to studies from patients documented as normal and to randomly selected liver/spleen imaging studies which had been previously interpreted as normal. The mean ratio from the pancreatic carcinoma group was significantly lower than the means of the respective normal groups (p[t] less than .0001 for rectilinear scans and p[t] less than .001 for scintigrams). There was no significant difference between the means of the proven normal and randomly selected normal groups or between the two pancreatic carcinoma groups. Splenic vascular alteration is discussed as a possible reason for decreased splenic distribution of Tc-99m-sulfur colloid in this patient group. (Author abstract) (21 Refs)

12. INVESTIGATION OF EARLY STAGE GASTRIC CARCINOMA WITH NUCLEAR MAGNETIC RESONANCE.

Yasuoka H, Satoh K, Hasegawa A, Yamagata H, Yorimitsu Y, Uchita Y, Kondo K, Iwata K
Inst. for Solid State Physics, Univ. Tokyo, Tokyo, Japan
Gan No Rinsho; 27(14):1743-1747 1981

Proton nuclear spin-lattice relaxation times (T1) of water molecules were determined in normal, ulcerous, and cancerous gastric tissues to see if there were differences in T1 values. Early stage tubular adenocarcinoma of the stomach (Type IIb or IIc) was diagnosed with the aid of biopsy in two pat ients (68-yr-old man and 54-yr-old woman), and gastric ulcers were diagnosed in one patient (66-yr-old man); T1 values were determined in tissues shortly after gastric lesions were resected. Approx 5 mm x 5 mm slices of surgical specimens were preserved at 0 C in nuclear magnetic resonance (NMR)-use glass tubes. T1 values were determined at room temperature within 6 hr of surgery, and the samples were then fixed in 10% formaline soln for pathohistological examination. T1 values were measured with pulse NMR technique at 30 megaHertz, corresponding to the field for 1H resonance of 7,046 Oersted. Surgical specimens were obtained from a 68-yr-old man with tubular adenocarcinoma, a 54-yr-old woman with tubular adenocarcinoma, and 66-yr-old man with gastric ulcer. T1 values differed according to the sample of even normal tissues, and T1 values were longer for cancerous tissues in the same sample. It was thought to be impossible to set fixed T1 values for determining whether or not a particular surgical sample is early stage cancer, but relative differences in T1 values in the same sample were thought to have diagnostic potential. Combining NMR and computed tomography was thought to be a possible means to directly image contrasting T1 values. (7 Refs) (In JPN)

13. APPLICATION OF RADIONUCLIDE METHODS IN ESTIMATING AFTER-EFFECTS OF GASTRECTOMY FOR CANCER.

Saenko AI, Bespalov II, Modnikov OP
Kirghiz Res. Inst. Oncology and Radiology, Frunze, USSR
Vopr Onkol; 27(10):26-29 1981

The fat, protein and B12 absorption by the liver, kidney and small intestine was studied by radionuclide methods in gastric cancer patients during the preoperative period as well as within 15-30 days, 3-12 mo and for more than a yr following gastrectomy. It was observed that the function of the kidney, liver and B12 absorption was disturbed during the preoperative period. Gastrectomy caused a marked depression of the renal, hepatic and small intestinal function. During later periods following gastrectomy, these functions improved but were not restored to normal. (Author abstract) (9 Refs) (In RUS)

ENDOCRINE NEOPLASMS

14. SERUM THYROGLOBULIN (S-HTG): A TUMOR MARKER IN PATIENTS WITH DIFFERENTIATED THYROID CARCINOMA.

Jansch A, Heinze HG, Hast B
(c/o Heinze) Klinik fur Strahlentherapie und Nuklearmedizin des Stadt, Klinikums Karlsruhe, Moltkestrasse 14, D-7500 Karlsruhe, W. Germany
Strahlentherapie; 157(6):381-392 1981

In 153 patients with thyroid carcinoma, 678 measurements of serum thyroglobulin were performed using a commercial radioimmunoassay. Within 3 mo after ablative therapy, S-hTG levels in patients without metastases dropped to concentrations beneath measurability, and stayed within that range if no recurrence or metastasization did occur, as has been shown by means of long-term observations during up to 6 yr. All the patients with distant metastases accumulating I-131 revealed measurable concentrations of S-hTG between 30 ng/ml and several 100 ng/ml. Distant metastases which do not accumulate the radioiodine can often also be detected early with the help of elevated S-hTG levels. In patients with residual thyroid tissue after the ablation, further augmentation of S-hTG levels indicates progression of the cancerous disease. The S-hTG value is an appropriate parameter for control of treatment in the case of I-accumulating metastases, as the levels of S-hTG in the course of the disease are well correlated with the response of metastases to treatment with radioiodine. In follow-up diagnostics of patients with differentiated thyroid carcinoma, it will, therefore, be possible to a large extent to renounce radioiodine scans in favor of S-hTG measurements for the search after local recurrence or metastases. (Author abstract) (45 Refs) (In GER)

15. THE USE OF RADIOIODINE IN THE MANAGEMENT OF THE DIFFERENTIATED THYROID CANCER.

Bestagno MF, Pagliaini R, Maira G, Terzi A
Nuclear Medicine Dept., City Hosp., Brescia, Italy
J Radioanal Chem; 65(1/2):239-249 1981

Use of radioiodine in management of 270 cases of differentiated thyroid cancer (DTC) is reported. The first and primary step in therapy was total thyroid ablation. As much of the thyroid was removed as possible without damaging nerves or parathyroid glands. Following surgery, 131I was administered (usual dose 80 mCi) to eradicate remaining thyroid tissue. A total body (TB) scan was performed on day 3 or 5 after treatment (AT). Patients with no indication of metastases were re-examined after 6 mo using a 5 mCi tracer dose and, if still without metastases, were put on a follow-up program. Patients with metastases received radioiodine therapy (usual dose 200 mCi, repeated every 3-6 mo) until disappearance of the focus. TB scans were performed after each treatment. Side effects were minimal. Of 202 cases, 119 were free of metastases (FOM), 62 had nodal involvement (LNI), and 21 had bone or lung metastases (BLM). Metastases were found by TB scan in 9.2% of FOM patients, 37.0% of LNI patients, and 28.6% of BNM patients. Patients with metastases detectable only by TB scan had a better prognosis than those with clinical or radiological signs. Results indicate that TB scans are useful for diagnosis and therapy of DTC, and that total thyroid ablation is required for successful detection of metastases. Safety precautions taken in conjunction with diagnosis and treatment are described. (38 Refs)

16. EARLY DIAGNOSIS OF THYROID CANCER.

Demidov VP, Gol'bert ZV, Voronetskii IB, Sergeev SA, Ageev IS
Dept. Head and Neck Tumors, P. A. Hertsen Res. Oncological Inst., Moscow, USSR
Sov Med; (10):101-103 1981

Diagnostic efficacy of complex examination was evaluated in 323 patients with no dular thyroid disease. Early thyroid carcinoma was detected in 93/363 patients (69/224 with adenomas, 19/79 with chronic nonspecific thyroiditis, and 5/20 with nodular goiter). Clinical symptoms of early cancer included prolonged history of a nodule (greater than 1 yr), rapid growth of the nodule during the last 6 mo, solid structure, and the presence of multiple nodules. Correct clinical diagnosis of thyroid cancer was made only in 22.6% of the patients. Scintigraphy with 131I showed 'cold' nodules in 37.6% of the patients with early cancer and in 27.1% of the patients with dysplasia. Correct cytological diagnosis of early cancer was made in 52.3% of the patients. At lymphography, irregular contour of the filling defect was observed in 95.8% of the patients with early cancer. Lymphography visualized cancer nodules up to 0.3 cm in diameter. (9 Refs) (In RUS)

17. IODINE-123 FOR PEDIATRIC THYROID STUDIES: AN EVALUATION OF ITS ROLE.

Gulenchyn KY, Brown RG, Green MD, Ash JM
Div. Nuclear Medicine, Dept. Radiology, Hosp. Sick Children, Toronto, Canada
J Radioanal Chem; 65(1/2):251-257 1981

The use of 123I for thyroid studies was evaluated in 17 children (newborn to 15 yr old). Sixteen thyroid scans were performed; two whole-body scans (WBS) were performed to detect metastases of thyroid carcinoma. One patient had two scans performed at a 1-yr interval. A dose of 150-1,000 uCi 123I was administered po according to body surface area. The only radionuclide contaminant in the 123I was 125I. Scans were made approx 24 hr after administration of 123I and utilized a pinhole collimator with a 0.5 or 1.0 cm aperture. Eight thyroid scans indicated normal thyroid function. Eight abnormal cases included one with a solitary palpable nodule who was receiving thyroxine, five with thyroiditis, and two with lingual thyroids. One WBS indicated lymphatic metastases, but did not detect hepatic metastases shown by 99mTc scans. The second WBS showed no abnormality except remnants of thyroid tissue. From the results a pediatric dose range of 250-750 uCi is recommended. Reduction of scanning time without loss of resolution requires increasing the dose of 123I. Initial screening with 99mTc is recommended; 123I scans are recommended in cases where 99mTc cannot provide adequate information and for WBS. (11 Refs)

18. PATHOLOGY OF THE COLD NODULE.

Brown CL
London Hosp. Medical Coll., London E1, England
Clin Endocrinol Metab; 10(2):235-245 1981

Pathological characteristics of thyroid nodules that fail to bind radioiodide or pertechnetate (cold nodules) are reviewed. Gross and microscopical appearance of colloid nodules, cysts, and adenomas are described. Histological identifying characteristics of unmetastasized differentiated thyroid carcinomas are given, with photomicrographs. Limitations of several methods which have been suggested as su bstitutes to conventional thyroid-seeking isotopic scanning are indicated. Operative biopsy continues to be the preferred diagnostic treatment in all cases of solitary cold nodule of the thyroid. (27 Refs)

19. THE MANAGEMENT OF RADIATION-INDUCED TUMOURS OF THE THYROID.

Korff JM, DeGroot LJ
Univ. Chicago Pritzker Sch. Medicine, Univ. Chicago Hosp. and Clinics, Chicago, IL
Clin Endocrinol Metab; 10(2):299-315 1981

Procedures are explained for the management of the thyroid tumors found in patients who have undergone neck irradiation in childhood. Management begins with the physical examination; patients with normal thyroid and no symptoms are advised to submit to re-examination every 2 yr and receive no further treatment. Patients with equivocal results of physical examination or with diffusely enlarged thyroids are given 99Tc pinhole-camera scintigraphy; those whose thyroids show diffuse uptake have thyroid tests and appropriate treatment and those whose thyroids exhibit a distinct nodule enter the same management path as those whose thyroids revealed distinct nodules on earlier physical examination. Total extracapsular lobectomy is followed by frozen section biopsy to determine the existence of malignancy. Benign tumors are removed by more or less subtotal thyroidectomy. Differentiated carcinoma and undifferentiated carcinoma both indicate near-total thyroidectomy. Surgery is followed by 131I scan, 131I uptake, chest x-ray, and a measurement of serum thyroglobulin (TG) level as appropriate, for the patients with differentiated carcinoma. Serum TG, bone scan, and chest x-ray are used for those with undifferentiated carcinoma. Depending upon the results of the above tests, treatments are selected from the following: external radiotherapy, injections of 30-50 mCi 131I, chemotherapy, and administration of thyroxine or tri-iodothyronine. (57 Refs)

20. PARATHYROID SCINTIGRAPHY WITH 131CS AND 201TL.

Ferlin G, Conte N, Bossato N, Perelli R, Fioretti P, Gasparoni P, Cesmerani M
Servizio di Medicina Nucleare, Ospedale Generale Provinciale, 31033 Castelfranco Veneto, Italy
J Nucl Med Allied Sci; 25(3):119-123 1981

Diagnostic efficacy of scintigraphy with 131-cesium (131Cs) was studied in 11 patients (2 men, 9 women, 31-64 yr old) with hyperparathyroidism. Surgery was performed in seven patients: all were found to have parathyroid adenoma. Among these patients, six had increased 131Cs accumulation. One patient with a 131Cs-negative scan at operation had a small (less than 0.5 cm in diameter) adenoma. Identical results were obtained in three Cs-positive patients in which the test was repeated with 99mTc pertechnetate and 201thallium. (13 Refs)

GENITOURINARY NEOPLASMS

21. DIAGNOSTIC VALIDITIES OF COMPUTED TOMOGRAPHY, ULTRASONOGRAPHY, AND RENAL SCINTIGRAM FOR INTRARENAL OR PERIHILAR CYSTIC DISEASE WITH A REVIEW OF 15 CASES OF PERIPELVIC CYSTS.

Okada Y, Nishibuchi S, Itoh H, Kawamura J, Yoshida O
Dept. Urology, Kyoto Univ., Kyoto, Japan
Hinyokika Kiyo; 27(9):1061-1070 1981

Peripelvic cysts are uncommon comprising about 5% of all cystic diseases of the kidney, but are of great interest because of their diagnostic as well as therapeutic problems. Computed tomography, ultrasonography and renal scintigram using 99mTc-DMSA (dimercaptosuccinic acid) have been recently introduced as diagnostic image techniques of the kidney, and have changed a decision tree for renal mass lesions. Fifteen cases of peripelvic cysts seen at Kyoto University Hospital from the yr of 1976 to 1979 were reviewed to evaluate retrospectively diagnostic accuracy of these new techniques, as compared to conventional roentgenographic examinations including angiography. The most valid methods for peripelvic cysts were computed tomography and ultrasonography. Renal scintigram and IVP were less effective. Angiography was the least valid. Ultrasonography is the most useful considering its ready availability, diagnostic accuracy for renal cysts, safety, economy, and non-invasiveness including x-ray. Direct needle punctures were not performed because of danger. Only 2 of 15 cases were operated and angiography was performed in 8 cases. After careful and total evaluation of these diagnostic studies, angiography and laparotomy can be dispensed, but watchful followup at OPD is mandatory to rule out other diseases or malignancy. (Author abstract) (10 Refs) (In JPN)

22. THE VALUE OF QUANTIFIED BONE SCANNING IN THE FOLLOW-UP OF PATIENTS WITH PROSTATIC CANCER AND METASTATIC BONE LESIONS.

Grob JC, Oliveux A, Cinqualbre J, Carloz I, Pellerin JP, Bollack C
Service des Isotopes, Centre Paul Straus, Centre Hospitalier Regional, 1, place de l'Hopital, 67091 Strasbourg, France
Ann Urol (Paris); 15(6):391-393 1981

Among 12 patients with prostate cancer and metastatic bone lesions, three groups were identified. In the first group (5 patients), a second bone scan (BS) 2 mo after the beginning of treatment revealed a regression of metastases. There was good correlation between the clinical evolution and the results of the BS. In the second group (4 patients), the course of the disease was unfavorable. In some cases, the level of fixation increased at each BS, which confirmed the resistance to treatment. In other cases, the level of fixation stabilized. In the third group (3 patients) consecutive BS did not reveal any significant differences. It is suggested that the responses in this last group of patients may indicate the absence of metastatic evolution and/or a partial response to treatment. (no Refs) (In FRE)

GYNECOLOGIC NEOPLASMS

23. PROGNOSTIC SIGNIFICANCE OF PERITONEAL CYTOLOGY IN PATIENTS WITH ENDOMETRIAL CANCER AND PRELIMINARY DATA CONCERNING THERAPY WITH INTRAPERITONEAL RADIOPHARMACEUTICALS.

Creasman WT, Disaia PJ, Blessing J, Wilkinson RH, Johnston W, Weed JC
Dept. Obstetrics and Gynecology, Duke Univ. Medical Center, Durham, NC, 27710
Am J Obstet Gynecol; 141(8):921-929 1981

One hundred sixty-seven patients with clinical Stage I carcinoma of the endometrium were treated primarily by operation consisting of total abdominal hysterectomy, bilateral salpingo-oophorectomy, selective pelvic and para-aortic lymphadenectomy, and cytologic testing of peritoneal washings. Twenty-six (15.5%) of the 167 patients had malignant cells identified on cytologic examinations of peritoneal washings. Recurrence developed in 10 of these 26 (34.0%) compared to 14/141 (9.9%) patients with negative cytologic testing. Of the 26 patients, 13 (50%) had disease outside of the uterus at operation and seven had died of disease (54%). Thirteen patients had malignant cells in the peritoneal washings but no disease outside of the uterus and 6 (46%) of these have died of disseminated intra-abdominal carcinomatosis. On the basis of the poor outcome of those patients who had malignant cells in the peritoneal washings in the 167 patients studied, a plan of treating such patients with intraperitoneal radioactive chromic phosphate suspension (P-32) was instituted. Twenty-three subsequent patients with clinical Stage I carcinoma of the endometrium were found to have malignant cells in the peritoneal fluid. All 23 received intra-abdominal P-32 suspension instillation after operation. There have been three recurrences with two patients dying of disease. All of the three recurrences appeared at sites distant from the abdominal cavity. Peritoneal cytologic examination appears to be an important factor in the prognosis of endometrial cancer and, when the washings are positive for malignant cells, intraperitoneal chronic phosphate therapy appears to be efficacious. (Author abstract) (10 Refs)

HEAD AND NECK NEOPLASMS

24. RADIONUCLIDE SCANS IN THE ASSESSMENT OF DISTANT METASTASES FROM SQUAMOUS CELL CARCINOMA OF THE HEAD AND NECK.

Martin GF, Gullane PJ, Heeneman H
(c/o Gullane) Dept. Otolaryngology, St. Joseph's Hosp., P.O. Box 5244, London, Ontario, N6A 4V2, Canada
J Otolaryngol; 10(5):383-386 1981

The efficacy of radionuclide scan for detection of distant metastasis was evaluated. Case histories of 111 patients (male:female ratio of 5:1, age 41-82 yr) with squamous cell carcinoma of the head and neck were reviewed. Initial examination included liver scan in 105 patients, bone scan in 83, and brain scan in 25. Positive liver, bone, or brain scans were observed in 4/105, 2/83, and 0/25 patients, respectively; three additional liver scans were indicative of metastatic disease. Of nine patients with positive or suspect scans, only one had Stage I, while four had Stage III, and four had Stage IV disease. The findings did not support the routine need for radionuclide scans in initial examination of patients with squamous cell carcinoma of the head and neck. (20 Refs)

25. FACIAL BONE SCINTIGRAPHY. VII. DIAGNOSIS OF MALIGNANT LESIONS IN THE MANDIBLE.

Bergstedt HF, Lind MG, Silfversward C
Dept. Diagnostic Radiology, Otolaryngology and Tumor Pathology, Karolinska Sjukhuset, S-10401 Stockholm, Sweden
Acta Radiol [Diagn] (Stockh); 22(4):485-493 1981

Fifty-four patients were examined clinically, radiographically and scintigraphically with respect to mandible bone involvement by oral carcinoma. Sixteen resected mandibular specimens were available for microscopic examination and the results were correlated to the clinical, scintigraphic and radiographic results. Clinical assessment overestimated and radiography underestimated oral carcinoma involvement of the mandible; scintigraphy was more accurate than was clinical assessment or radiography. Combination of clinical examination with both conventional radiography and bone scintigraphy is recommended for optimum diagnosis of mandible bone involvement by oral carcinoma. (Author abstract) (44 Refs)

26. METHODS OF FIXATION OF TECHNETIUM IN SALIVARY TUMORS AND THEIR CONSEQUENCES FOR DIAGNOSIS.

Tainmont J, Dourov N
Service ORL, Hopital Militaire Reine Astrid, Rue Bruyn, B-1120 Bruxelles, Belgium
Acta Otorhinolaryngol Belg; 35(2):189-197 1981

Four types of findings of technetium (TC) scintigraphy studies of salivary gland (SG) tumors are reported: SG cancer with no fixation, mixed tumor with nearly normal fixation, cancer of adjacent lymph nodes with normal SG fixation, and Warthin's tumor with hyperfixation. SG cylindroma do not fix TC but given adequate time, enlarged intercellular spaces will take up TC. When TC is combined with bleomycin, SG squamous cell tumors fix TC. Slight differences in TC binding exhibited by mixed SG tumors may result from vascular abnormalities related to neoplasia. The variability of results of studies for TC fixation by mixed SG tumors is discussed. TC scintigraphy findings in sub- and juxta-maxillary tumors and secondary invasion of the SG with adenopathy are described. Warthin tumors contain numerous cavities containing a rough eosinophilic material bordered by with eosinophilic cells; this structure results in hyperfixation of TC. The cystic nature of Warthin's tumor is evident with TC scintigraphy. (12 Refs) (In FRE)

27. NUCLEAR MEDICINE IN DIAGNOSIS AND TREATMENT OF DISEASES OF THE HEAD AND NECK. I. SALIVARY AND PARATHYROID GLAND DISEASE AND ONE IDENTIFICATION AND STAGING OF HEAD AND NECK TUMORS.

Blahd WH, Rose JG
Veterans Admin. Wadsworth Medical Center, 691/115, Los Angeles, CA, 90073
Head Neck Surg; 4(2):129-135 1981

The role of nuclear medicine in the evaluation of disease of the salivary and parathyroid glands and in the identification and staging of head and neck tumors is discussed. Radionuclide imaging can be used in the study of the physiology and anatomy of salivary glands and pathologic disorders, such as Sjogren's syndrome, inflammatory disease, sarcoidosis, and mass lesions (primary and metastatic tumors, cysts, abscesses, glandular destruction). Diagnosis of adenoma or hyperplasia of the parathyroid gland with imaging technics remains unsatisfactory. Use of Gallium 67 citrate in the identification and staging of head and neck tumors is described. (24 Refs)

HEMATOLOGIC, RETICULOENDOTHELIAL, AND LYMPHATIC NEOPLASMS

28. THYMIC GALLIUM-67 LOCALIZATION IN PEDIATRIC PATIENTS ON CHEMOTHERAPY: CONCISE COMMUNICATION.

Donahue DM, Leonard JC, Basmadjian GP, Nitschke RM, Hinkle GH, Ice RD, Wilson DA, Tunell WP
(c/o Basmadjian)Coll. Pharmacy, Univ. Oklahoma, Oklahoma City Campus, Oklahoma City, OK, 73190
J Nucl Med; 22(12):1043-1048 1981

Localization of Ga-67 in the thymus has been reported to occur in children. In our control group of 87 patients, 15% of children under 5 yr and 11% of children over 5 yr demonstrated thymic localization. In contrast, in our study group of seven children with acute lymphocytic leukemia or malignant lymphoma, lymphocytic diffuse, treated on a modified non-Hodgkin's lymphoma protocol, Sloan-Kettering LSA2-L2 thymic localization occurred during treatment in five of the seven. We conclude that increased thymic gallium localization in children under chemotherapy for a known malignancy may reflect increased activity of thymic medullary epithelial cells and regeneration of thymic lymphocytes during recovery from involution induced by certain chemotherapeutic agents. (Author abstract) (24 Refs)

29. 67GA SCANNING AND UPPER GASTROINTESTINAL SERIES FOR GASTRIC LYMPHOMAS.

Ichiya Y, Oshiumi Y, Kamoi I, Imoto T, Shimoda Y, Kitagawa S, Matsuura K
Dept. Radiology, Kyushu Univ., Maidashi, Fukuoka 812, Japan
Radiology; 142(1):187-192 1982

In 13 patients with gastric lymphomas, 67Ga scanning and upper gastrointestinal (UGI) series were performed before any treatment was initiated. Seven of these patients also underwent both examinations after completing chemotherapy and/or radi-

ation therapy. Prior to treatment, all 13 patients had abnormalities on the UGI examination, and 12 of them had abnormalities on the 67Ga scans. In six patients, more extensive gastric abnormalities were demonstrated by 67Ga scanning than by UGI examination. Although persistent 67Ga uptake after treatment was indicative of relatively poor therapeutic response, lack of uptake did not always indicate a good response to treatment. (Author abstract) (15 Refs)

30. DIAGNOSTIC POSSIBILITIES OF LIVER AND SPLEEN SCINTIGRAPHY IN HODGKIN'S DISEASE PATIENTS.

Kholin VV, Volkov AA, Kovryzhkina TA, Kucherova ID
S. M. Kirov Inst. Advanced Training for Physicians, Leningrad, USSR
Vrach Delo; (10):72-74 1981

Diagnostic efficacy of liver and spleen scintigraphy was evaluated in 92 Hodgkin's disease (HD) patients. The signs of liver involvement were observed in 22.8% of the patients. Scintigraphy with 198-Au or 99m-Tc showed enlargement of the left liver lobe and diffuse colloid distribution. These symptoms were similar to those in hepatitis or liver cirrhosis. Nonspecific symptoms of spleen involvement were observed in 49.4% of the patients. (no Refs) (In RUS)

31. CHARACTERISTICS OF SIMPLE DISTRIBUTIONS OF HEMATOPOIETIC BONE MARROW IN CASES OF ATYPICAL LEUKEMIA.

Miki M
First Division, Dept. Internal Medicine, Kyoto Univ. Faculty Medicine, Kyoto, Japan
Rinsho Ketsueki; 22(6):778-780 1981

Bone marrow scintigraphy using Tc-99m sulfur colloid was performed in 20 patients with aplastic anemia (APA), 6 with atypical APA (AAPA), 4 with hypoplastic leukemia (HYPL), 6 with acute myelocytic leukemia, 8 with chronic myelocytic leukemia, 1 with smouldering leukemia, and 28 with other types of leukemia. The Tc-99m sulfur colloid (10 mCi) was injected iv in the patients, and the patients' skeletons were imaged with the aid of a Hitachi Gamma-View H, 30-60 min after injection and after the patients urinated. In hematologically normal subjects, active bone marrow was visualized in the skull, sternum, vertebrae, pelvises, and heads of the humerus and femurs. In 3/20 patients with APA, 6/6 with APA, and 4/4 with HYPL, island-like spots of accumulated Tc-99m sulfur colloid were observed in the tibias and fibulas; the island-like spots were also observed in the pelvices of the patients with APA. The island-like spots in the patients with HYPL were thought to be hematopoietic sites of new clones. Similar abnormal features that were observed in both the patients with APA and those with HYPL suggested a clonal relationship between the two diseases. The Tc-99m sulfur colloid bone scintigraphy was thought to have potential as a differential diagnostic procedure for hypoplastic hematopoietic diseases, particularly HYPL. (1 Ref) (In JPN)

32. BONE MARROW SCINTIGRAPHY IN ACUTE LEUKEMIA.

Sakhibov IaD
M. F. Vladimirskii Clinical Inst., Moscow, USSR
Sov Med; (10):22-26 1981

Prognostic efficacy of bone marrow scintigraphy with 99mTc-sulfur colloid was studied in 20 patients (10 men, 10 women; 16-65 yr old) with acute leukemia. The patients received polychemotherapy (PC) with vincristine, methotrexate, 6-mercaptopurine, and prednisone. Three scintigraphic patterns of the bone marrow were observed. Nine patients had normal visualization of the hematopoietic tissue (Group 1), five patients showed mild expansion of the hematopoietic tissue with visualization of the bone marrow in the long tubular bones up to the level of the elbow and knee joints (Group 2), and six patients showed marked expansion of the hematopoietic tissue with visualization of the bone marrow in virtually all tubular bones (Group 3). Of nine patients in Group 1, four were in complete remission and four were in partial remission. The patients in Group 2 failed to enter the remission. Of six patients in Group 3, one entered a complete remission after three courses of PC. (10 Refs) (In RUS)

33. BONE LESIONS IN CHRONIC MYELOGENOUS LEUKAEMIA.

Valimaki M, Vuopio P, Liewendahl K
Third Dept. Medicine, Univ. Central Hosp., SF-00290 Helsinki 29, Finland
Acta Med Scand; 210(5):403-408 1981

The incidence and site of bone lesions in 33 patients with chronic myelogenous leukemia were studied by performing bone scintigraphy and radiography. The scintigrams were abnormal in 67% and the radiographs in 29%. Increased juxtaarticular uptake of radioactivity was observed particularly in acute phase patients, whereas areas of focal uptake were detected in many chronic phase patients. Nearly all patients suffered from bone pains before the development of demonstrable osseous lesions. Hypercalcemia was found in one patient with blastic transformation and bone lysis. Two patients with extensive bone destruction were treated with vincristine, prednisone and local irradiation in spite of hematological remission. No hematological relapse has occurred in these two patients during follow-up for 12 and 41 mo, respectively. (Author abstract) (15 Refs)

34. THROMBOTIC RISKS OF STAGING LAPAROTOMY WITH SPLENECTOMY IN HODGKIN'S DISEASE.

Dawson AA, Bennett B, Jones PF, Munro A
(c/o Bennett) Dept. Medicine, Aberdeen Royal Infirmary, Foresterhill, Aberdeen AB9 2ZB, Scotland
Br J Surg; 68(12):842-845 1981

No significant excess of deep vein thrombosis (DVT) as measured by the 125I-labelled fibrinogen method was observed in patients having staging laparotomy and splenectomy for Hodgkin's disease (HD) compared with patients having elective cholecystectomy under highly standardized surgical conditions. Patients who did have DVT all had splenic involvement with HD. There was no correlation between the post-splenectomy thrombocytosis and the occurrence of DVT. Patients with non-Hodgkin's lymphoma (NHL) and splenomegaly had a high incidence of DVT after splenectomy. (Author abstract) (19 Refs)

MUSCULOSKELETAL NEOPLASMS

35. RADIONUCLIDE BONE IMAGING.

Bassett LW, Gold RH, Webber MM
Dept. Radiological Sciences, Div. Diagnostic Radiology, Univ. California Los Angeles, Sch. Medicine, Los Angeles, CA, 90024
Radiol Clin North Am; 19(4):675-702 1981

Radionuclide bone imaging of the skeleton is now well established as the most im portant diagnostic procedure in detecting bone metastases. It is also a reliable method for the evaluation of the progression or regression of metastatic bone disease. Technetium-labeled diphosphonate and phosphate scans are also effective in localizing occult osteomyelitis and early fractures. The application of radionuclide imaging to the early detection of osteonecrosis and to the detection of complications of joint replacement is being evaluated and will likely become important in the routine assessment of these problems. The role of bone scanning in other areas of skeletal disease depends on further investigations. The greatest advantage of bone scanning is its high sensitivity to abnormal bone activity. Its most obvious limitation - poor specificity - can be minimized if the scan findings are interpreted in conjunction with pertinent clinical and radiologic data. (Author abstract) (28 Refs)

36. MULTIPLE 'COLD' AREAS DEMONSTRATED ON BONE SCINTIGRAPHY IN A PATIENT WITH NEUROBLASTOMA.

Cook AM, Waller S, Loken MK
Dept. Radiology, Div. Nuclear Medicine, Univ. Hosp., Box 382, Mayo Memorial Bldg., 420 Delaware St. S.E., Minneapolis, MN, 55455
Clin Nucl Med; 7(1):21-24 1982

A 'cold' or photopenic defect on bone scintigraphy is a well recognized phenomenon and has been described in several conditions affecting bone. An unusual case of multiple 'cold' defects in a patient with Stage IV neuroblastoma is presented. A follow-up scan with the patient in clinical remission shows resolution of these 'cold' defects. The patient subsequently relapsed and again multiple new 'cold' defects were noted on bone scintigraphy. The possible etiology of 'cold' defects is discussed. (Author abstract) (9 Refs)

37. MONITORING OF BONE METASTASES.

Galasko CS
Dept. Orthopedic Surgery, Univ. Manchester, Hope Hosp., Clinical Sciences Building, Eccles Old Road, Salford M6 8HD, England
Schweiz Med Wochenschr; 111(49):1873-1875 1981

Skeletal scintigraphy is the most sensitive method of detecting skeletal metastases currently available. The uptake of bone-seeking radionuclides is non-specific and x-rays, tomograms and even CT scans may be required to avoid false positives due to uptake by other lesions. Serial scintigrams can be used to assess the response of skeletal metastases to treatment. (Author abstract) (25 Refs)

38. THE 'HOT' PATELLA.

Kipper MS, Alazraki NP, Feiglin DH
(c/o Alazraki), Veterans Admin. Medical Center (115), 500 Foothill Blvd., Salt Lake City, UT, 84148
Clin Nucl Med; 7(1):28-32 1982

Increased patellar uptake on bone scans is seen quite commonly but the possible or probable etiologies of this finding have not been previously well described. A review of 100 consecutive bone scans showed that the incidence of bilateral 'hot' patellae is 15%. Identified etiologies include oste oarthritic degenerative disease (35%), fracture, possible metastatic disease, bursitis, Paget's disease, and osteomyelitis. The value of careful history, physical examination, and radiographs is stressed. (Author abstract) (9 Refs)

RESPIRATORY AND CARDIOVASCULAR NEOPLASMS

39. COMPUTER SUBTRACTION SCINTIGRAPHY OF PULMONARY TUMORS WITH 67GA-CITRATE AND 113MIN-CHLORIDE.

Fadeev NP, Barcuk AS
Pesocnyi 2, Leningradskaja 68, 188646 Leningrad, USSR
Radiobiol Radiother (Berl); 22(4):498-505 1981

Computer subtraction scintigraphy (CSS) was used to study pulmonary carcinomas in 25 patients. Twenty patients were treated by surgery; five cases were inoperable due to extensive tumor. CSS was carried out using a computer system with a gamma-camera. Each patient received 2-2.5 mCi 67Ga-citrate iv 2-3 days before the procedure. After an initial scintigram was made, and while the patient was still on the apparatus, 0.8-1.0 mCi 113mIn-chloride was injected iv. After 15-20 min a second scintigram was made. A final image was produced by computer subtraction of the values of obtained in the second image from those obtained in the first image. The effect was to reduce the radioactive background produced by 67Ga in tissue surrounding the tumor. Visualization of the tumor was greatly improved over that obtained by not subtraction scintigraphy, particularly in cases where inflammatory conditions surrounding the tumor (NSS) absorbed sufficient 67Ga to mask the tumor in NSS. Results confirm the value of CSS and the suitability of 113mIn-chloride for evaluation of pulmonary carcinoma. (13 Refs) (In GER)

MISCELLANEOUS

40. HUMAN CHORIONIC GONADOTROPIN RADIOANTIBODIES IN THE RADIOIMMUNODETECTION OF CANCER AND FOR DISCLOSURE OF OCCULT METASTASES.

Goldenberg DM, Kim EE, DeLand FH
Div. Experimental Pathology, Dept. Pathology, Univ. Kentucky and Veterans Admin. Medical Centers, Lexington, KY, 40536
Proc Natl Acad Sci USA; 78(12):7754-7756 1981

Radioimmunodetection (RaID) of tumors containing human chorionic gonadotropin (hCG; choriogonadotropin) was evaluated in 25 patients by injecting 131I-labeled goat antibody IgG against hCG and performing total-body photoscans with a gamma-scintillation camera 24 and 48 hr later. All 10 testicular cancer patients with proven tumor sites had positive RaID results, whereas three cases without known tumor were negative. Four patients with hydatidiform mole and one with degenerative products of conception showed positive RaID results consistent with elevated serum hCG titers. Two putatively false-positive results were obtained in patients with lung or ovarian cancer, whereas a false-negative metastasis to the liver of a patient with lung cancer and an elevated serum hCG titer

was observed. Of 14 tumor sites found by RaID in 10 testicular cancer patients, 4 were revealed by RaID prior to any other detection method used and provided a lead time to definitive diagnosis by other measures of a few days to greater than 1 yr. Although a number of patients had high serum hCG levels, even exceeding 3 ug/ml, the xenogeneic antibody was capable of localizing in tumor. No adverse effects were noted in any of the patients studied. Thus, hCG RaID appears to be a safe and effective method of detecting and locating hCG-producing tumors and has been found to disclose occult testicular cancers. (Author abstract) (26 Refs)

41. RADIOLABELLED MONOCLONAL ANTI-CEA ANTIBODIES FOR SCANNING DETECTION OF HUMAN CARCINOMAS (MEETING ABSTRACT).

Mach JP, Buchegger F, Forni M, Ritschard J, Accolla R, Carrel S
Ludwig Institute for Cancer Research, Lausanne Branch, 1066 Epalinges, Switzerland
UICC Conference on Clinical Oncology, October 28-31, 1981, Lausanne, Switzerland. International Union Against Cancer 131 pp., 1981.

Monoclonal antibodies with a high specificity and affinity for carcinoembryonic antigen (CEA) were purified from hybridoma ascites, labeled with 131I and injected first in nude mice bearing human carcinoma grafts and later in tumor bearing patients. The results from the pilot human studies, obtained by external scanning of the patients and by direct measurement of the radioactivity in resected tumors and adjacent normal tissues showed that monoclonal anti-CEA antibodies are capable of specific tumor localization in some patients. Ten out of 20 patients with colon or pancreas carcinoma injected with labeled monoclonal antibodies showed positive 'immuno-scintigraphy'. The specificity indices of localization obtained by comparing in fragments of tumor and normal tissues, the 131I radioactivity of the antibodies with the 125I radioactivity of control normal mouse IgG injected simultaneously with the antibodies, gave values ranging from 2-6. The non-specific accumulation of antibody radioactivity in the reticuloendothelium was much lower than with polyclonal antibodies. These encouraging results, however, are not sufficient to recommend this method of 'immune-scintigraphy' for routine tumor detection. (1 Ref)

42. SCINTIGRAPHIC IDENTIFICATION OF LYMPHATIC DRAINAGE OF MALIGNANT MELANOMA OF THE TRUNK.

Altmeyer P, Munz D, Steinhoff W, Hor G, Holzmann H
Zentrum der Dermatologie und Virologie, Theodor Stern Kai, D-6000 Frankfurt/M., W. Germany
Aktuel Dermatol; 7(5):127-130 1981

Lymphoscintigraphy (LS) was performed on 21 patients with malignant melanoma (MM) of the trunk. MM types included superficially spreading (11 cases), primary nodular (6 cases), lentigo maligna (2 cases), and unclassifiable (2 cases). LS was performed preoperatively and ipsilaterally in 13 cases, postoperatively and ipsilaterally in 5 cases, and postoperatively and contralaterally in 3 cases. Co ntralateral LS was done to determine the original lymphatic drainage of the excised tumor, on the assumption of symmetrical lymphatic patterns. LS followed injection of 1.5-2.0 mCi 99mTc-labeled colloidal antimony sulfide divided among 4-6 sites 0.5-1 cm from the edge of the tumor (or along the edge of scar tissue in postoperative LS), injected intracutaneously and sc. As indicated by five case examples, lymphatic drainage varied greatly from one individual to another, preventing any general anatomical conclusions. Tumors in the region of Sappey's veins showed particularly variable drainage to axillary and/or inguinal lymph nodes. Results demonstrate the utility and low risk of LS for individual determination of lymphatic regions at risk due to MM. (10 Refs) (In GER)

SELECTED PRE-CLINICAL STUDIES

43. IODINE-125 CYTOTOXICITY: IMPLICATIONS FOR THERAPY AND ESTIMATION OF RADIATION RISK.

Bloomer WD, Adelstein SJ
Dept. Radiation Therapy and Radiology, Harvard Medical Sch., Boston, MA
Int J Nucl Med Biol; 8(2):171-178 1981

The consequences of differential subcellular radionuclide accumulation, particularly within nuclear structures, have important implications for the design and development of radiopharmaceuticals for therapy as well as for the estimation of radiation risks. There is a growing body of experimental data demonstrating that localization of 125I within nuclear structures results in marked cytotoxicity. This report reviews the physical and biological consequences of 125I decay when 125I is incorporated into cells as iododeoxyuridine or iodotamoxifen. (Author abstract) (28 Refs)

44. THE ROLE OF SUBCELLULAR LOCALIZATION IN ASSESSING THE CYTOTOXICITY OF IODINE-125 LABELED IODODEOXYURIDINE, IODOTAMOXIFEN, AND IODOANTIPYRINE.

Bloomer WD, McLaughlin WH, Weichselbaum RR, Hanson RN, Adelstein SJ, Seltz DE
Dept. Radiation Therapy, Harvard Medical Sch., Boston, MA
J Radioanal Chem; 65(1/2):209-221 1981

The role of subcellular localization in the cytotoxicity of 125I-bearing compounds was studied in vitro in the MCF-7 cell line of human breast cancer, which was derived from a malignant pleural effusion. Cell cultures were exposed to 125I-labeled tamoxifen (125ITAM), 125I-iodoantipyrine (125IAP), or 125I-iododeoxyuridine (125IUdR) at various concentrations. Cellular uptake of 125IUdR and 125IAP was directly proportional to media concentration of the compounds, with 125IUdR being more avidly accumulated than 125IAP. 125IUdR was incorporated directly into the DNA backbone as a thymidine analog; 125IAP was distributed according to body water. Uptake of 125ITAM was time dependent, with a steep initial rise followed by a plateau at 20 min, 37 C; at 4 C uptake was less steep, but linear. Withdrawal of 125ITAM from the medium was followed by a rapid efflux of unbound intracellular (IC) 125ITAM, leaving about 20% of 125ITAM activity within the cell after 50 min. The retained IC activity represented specifically and nonspecifically bound 125ITAM. With survival measured as a function of media concentration, D37 values were 8 x 10(-4) uCi/ml for 125IUdR, 2.3 uCi/ml for 125ITAM, and 68 uCi/ml for 125IAP. With survival measured as a function of protein- or nucleic acid-bound fractions, 125ITAM was approx as toxic as 125IUdR. Results indicate the importance of considering subcellular localization in determining the cytotoxic effects of Auger-emitting compounds. (43 Refs)

45. THE BIOLOGICAL ACTIVITY OF RADIOIODINATED ANTI-T ANTIBODIES.

Bray J, Noujaim A, Turner C, Lentle BC
Cross Cancer Inst., Edmonton, Alberta, Canada
J Radioanal Chem; 65(1/2):259-268 1981

The biological activities of radioiodinated antibodies (anti-T) to Thomsen agglutination antigens (T antigen) were studied. Synthetic T antigen (STA) was prepared and rabbit and human anti-T were obtained. Anti-T were labeled with 125ICl using direct, indirect, or protected methods. In the protected method the antigen combining sites of the anti-T were shielded during iodination. Antigen binding activity (ABA) of each anti-T was assayed against STA and against neuraminidase-treated RBC (N'RBC), which bore the T-antigen. ABA of rabbit anti-T to STA was 58% for direct, 84% for indirect, and 80% for protected forms. ABA of human anti-T was 7% for direct and 25% for protected forms. ABA of rabbit anti-T to N'RBC was 3% for direct, 6% for indirect, and 16% for protected forms. ABA of human anti-T to N'RBC was 0% for direct and less than 1% for protected forms. Results indicated that radioiodination of rabbit anti-T can be carried out without significant loss of biological activity. Although all of the rabbit antibodies tested were specific for isolated T-antigen, only a fraction had a high affinity for cell-bound antigen. Caution is urged in comparing antibody affinities for isolated antigens in vitro with affinities for cell-bound antigens in vivo. (19 Refs)

46. IS THE NUDE MOUSE BEARING A HUMAN TUMOR THE BEST MODEL FOR STUDY OF TUMOR-LOCALIZING RADIONUCLIDES?

Chatal JF, Diez E, Guihard D
Fra 13 Inserm and Laboratoire de Biophysique, UER de Medicine, 44035 Nantes Cedex, France
Int J Nucl Med Biol; 8(2):181-183 1981

Diagnostic efficacy of 67Ga-citrate was studied in C57Bl6 mice bearing methylcholanthrene-induced Lewis lung tumors and in nude mice bearing transplanted human lung carcinoma. The absolute values of human tumor uptake were approx 2x as high as those in the murine tumor. Human tumors heterotransplanted in nude mice may constitute the best model for the study of tumor-seeking radiotracers. (8 Refs)

47. THE USE OF LABORATORY LYMPHOGRANULOMATOSIS OF MICE, STRAIN SJL/J, FOR TESTING OF LABELED RADIOPHARMACEUTICALS FOR POSITIVE SCINTIGRAPHY.

Gubareva AV, Fadeev NP, Markocev AB, Savel'eva OP, Ivanova LV
Wissenschaftliches Zentralinstitut fur Rontgenologie und Radiologie, Ministerium fur Gesundheitswesen der UdSSR, Pesocnyi 2, Leningradskaja 70/4, 188646 Leningrad, USSR
Radiobiol Radiother (Berl); 22(4):527-532 1981

The suitability of a laboratory type of spontaneous lymphogranulomatosis (LG) in SJL/J mice for testing tumor tropism of radioisotopic compounds was studied. A total of 800 mice were divided according to the highest stage of tumor development into age groups. Each mouse received 10 uCi of a test compound iv by the tail vein. Test compounds were 67Ga-gallium citrate (GC), 111In-indium citrate (IC), 197Hg-mercuric chloride (MC), 75Se-methionine (SM), and 75Se-sodium selenite (SS). Animals were killed at various times after injection. Radiographs were made of liver, kidney, spleen, heart, lung, thymus, lymph nodes, colon, blood, and skeletal muscle tissue. SM and SS were found to concentrate in diseased lymph nodes. GC, IC, and MC accumulated in pretumorous lymph nodes, but not in tumorous nodes. The SJL/J LG model was deemed suitable for testing radiopharmaceuticals for scintigraphy because of its similarity to the reticular form of human LG. Reduction of false diagnoses required the use of two radioisotopic compounds: SM or SS with MC, GC, or IC. (10 Refs) (In GER)

48. CHEMICAL PROPERTIES AND TUMOR AFFINITY OF SEPARATED ISOMERS OF COBALT-BLEOMYCIN.

Kakinuma J, Samezima K, Nakamura K, Kawaguchi H, Koike K, Orii H
Tokyo Metropolitan Inst. Medical Science, Bunkyo-ku, Tokyo 113, Japan
Kaku Igaku; 18(6):835-839 1981

Cobalt 57-bleomycin is a chemically stable and diagnostically useful radiopharmaceutical. Stoichiometric preparation of Co-bleomycin causes two chemically different complexes. Four kinds of chelates (A2-type I, A2-type II, B2-type I and B2-type II) are easily separated by silica gel thin layer chromatography. Circular dichroism study of these chelates indicates that two types of complexes are conformational isomers. This chemical difference is assumed to cause the difference in biological behavior. A biodistribution study of each type of complex, using tumor-bearing mice, showed higher tumor-to-blood ratios and tumor-to-muscle ratios than found with the clinical grade Co-bleomycin mixture, but the difference between the two types was not very large. The similarity in biologic behavior suggests that the groups on the bleomycin molecule which are concerned with chelate formation do not take part in its binding to DNA. (9 Refs) (In JPN)

REVIEWS

49. THE RADIOTOXICOLOGY OF IODINE.

Taylor DM
Inst. Genetics and Toxicology, Kernforschungszentrum Karlsruhe, Postfach 3640, D-7500 Karlsruhe, W. Germany
J Radioanal Chem; 65(1/2):195-208 1981

Toxicology of radioisotopes of iodine is reviewed. Of 30 isotopes, those with mass numbers 123-135 have major radiotoxicological significance. Those with medical applications are 123I, 125I, 131I, and 132I; 129I is a potential environmental hazard. Radiotoxicity (RT) depends on the type of radiation emitted, the half-life of the isotope, and patterns of uptake and retention in the body as a whole and in specific tissues. Induction of benign or malignant thyroid tumors or depression of thyroid function may result from exposure to inorganic 125I or 131I. RT of 131I is greater than that of 125I; 132I, 133I, and 135I, with shorter half-lives, are 10-100x as toxic as 131I. Induction of adrenal, pituitary, and ovarian tumors, parathyroid hypofunction, and other disturbances caused by radioiodine have been demonstrated in animals but not in man. Birth defects and spontaneous abortions in man have not been increased by gonadal doses of up to 800 milligray 131I. RT of organic I-compounds has not been well-studied. Iododeoxyuridine, when labeled with 125I, produces severe and sometimes irreparable damage by Auger electrons when incorporated into DNA. Thyroid carcinoma or adenoma is produced in an estimated 10-20 x 10(-6) persons/Gray/yr by 131I; the risk from mixtures of shorter-lived isotopes may be considerably higher. (50 Refs)

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CANCER DETECTION AND MANAGEMENT

Nuclear Medicine

SERIES CT02 No. 82/06 JUNE, 1982

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BREAST NEOPLASMS

1. LACK OF VALUE OF BONE SCANNING IN THE FOLLOW UP OF HIGH RISK BREAST CANCER (MEETING ABSTRACT).

Armand JP, Boneu A, Lacot H, Naja A, Combes PF
11, Rue Pique mil, Centre Claudius-Regard, 31052 Toulouse, France
UICC Conference on Clinical Oncology, October 28-31, 1981, Lausanne, Switzerland. International Union Against Cancer 131 pp., 1981.

This retrospective study was undertaken to verify the value of bone scan (BS) in a group of high risk breast cancer patients submitted to adjuvant chemotherapy. Out of 635 breast treated

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in Toulouse from January 1976 to December 1977, a group of 84 patients (Pt), treated by adjuvant CME (cyclophosphamide, methotrexate, 5-fluorouracil) and followed for at least 2 yr, has been selected. The group stratification was: pre-menopause 72% - post-menopause 28%, median age 47 yr, stage I: 13%, Stage II: 39%, Stage III: 36%; at 24 mo 76% are free of disease -24% are relapsed- median follow up was 32 mo. BS (325) have been performed in 84 Pt, using 99mTc polyphosphate or pyrophosphate and a Pho Gamma III Nuclear Chicago Camera. Two hundred and seventeen BS were systematic at a 6 mo interval, 18 BS were motivated by clinical symptoms. Systematic BS have recognized only 2 out of 6 scan conversion in 84 Pt. In 4 scan conversions, BS was motivated by pain or other metastases. The median delay of scan conversion was 19 mo after surgery. Isolated scan conversion did not induced any modification in treatment. Scan cost and radiation exposure risk have to be estimated in indication of BS. Although bone scan do detect early metastases there is no place for routine bone scanning in high risk CMF patients during the first post-operative years. (no Refs)

2. EFFICACY OF RADIOLOGIC DIAGNOSIS OF SKELETON (COMBINATION OF SKELETON SCINTIGRAPHY WITH RADIOGRAPHIC DIAGNOSIS) FOR DETECTION OF BONE MFTASTASES IN MAMMARY CARCINOMA.

Schalldach U, Drescher W, Endert G, Hegemann R, Kleinert K, Schumann E
Radiologische Klinik und Poliklinik, Medizinische Akademie Erfurt, Nordhauser Str. 74, DDR-5060 Erfurt, E. Germany
Zentralbl Chir; 106(20):1383-1386 1981

Scintigraphy (SC) and radiography (RG) were evaluated in early diagnosis of bone metastases (BM) spreading. Two hundred thirty-six patients with mammary carcinoma (MC) had 355 scintigrams and skeleton radiographs. Of the 236 MC patients, 108 had SC results, indicating BM. In 23 MC patients SC results were false positive, because 6 of them had repeated SC that produced normal results, and the other 17 had degenerative changes of spine, confirmed by RG. Results of clinical and laboratory examination also indicated absence of BM in these 23 MC patients. Results of SC and RG were positive in 50 MC patients. Another 15 MC patients had positive SC results, and negative RG, however, RG results became positive later on. Additional 20 MC patients had positive SC results, confirming clinical symptoms and indicating BM, although RG results were negative. The SC showed more sensitivity for BM detection, indicating BM appearance, several months to more than one yr before RG evaluation. (11 Refs) (In GER)

3. SCINTIGRAPHY IN THE DIAGNOSIS OF THE SPREAD OF BREAST CANCERS (MEETING ABSTRACT).

Chatal JF
Centre R. Gauducheau, Nantes, France
Third Meeting of the French Society of Senology and Mammary Pathology, October 15-17, 1981, Versailles, France Centre Rene Huguenin; 1981

In 1981, ultrasonography and computed tomography are offering a serious challenge to the conventional radionuclide scan in the study of the metastatic spread of breast cancers to the liver and brain. There should nevertheless be a renewal of interest in the isotope method as a result of emission tomography which provides a two- or three-fold improvement in the contrast of pathological images as well as the possibility of three-dimensional images. There is also in prospect the clinical application of radiolabeled monoclonal antibodies directed against breast cancer cells. Initial studies using conventional anti-carcinoembryonic antigen (CEA) antibodies have been encouraging. (no Refs)

4. AXILLAR LYMPHOSCINTIGRAPHY AFTER MODIFIED RADICAL MASTECTOMY (MEETING ABSTRACT).

Loriaux C
Universite Libre de Bruxelles, Brussels, Belgium
Third Meeting of the French Society of Senology and Mammary Pathology, October 15-17, 1981, Versailles, France Centre Rene Huguenin; 1981

Lymphoscintigraphic investigation of the axilla has been performed in 68 patients after modified radical mastectomy according to Madden. Results have been analyzed in relation to the experience of the surgeon and to the anatomo-pathological status of the axillary nodes. Axillary lymphoscintigraphy allows the evaluation of the postoperative residual lymph nodes and thus gives information about the quality of the surgery. Importance of the 'residual' nodes for the prognosis of the disease and for its management is under evaluation. (no Refs)

CENTRAL NERVOUS SYSTEM NEOPLASMS

5. BRAIN TUMOR EVALUATION USING PET AND RB-82 (MEETING ABSTRACT).

Yen CK, Yano Y, Budinger TF, Friedland R, Derenzo S, Huesman R
Donner Laboratory, University of California, Berkeley, CA
Clin Nucl Med; 6(9S):448 1981

Positron emission tomography (PET) of the brain with rubidium 82 (Rb-82) obtained from a portable generator (Sr-82(25 days)-Rb-82(76 seconds)) was used to evaluate the blood-brain barrier (BBB) integrity of brain tumors in patients. Rubidium is normally excluded from the CNS by the intact BBB. The BBB is disrupted by the tumors and allows entry into the CNS of intravenously administered Rb-82 tracers. Since RB is also rapidly cleared from the blood, high tissue to blood ratio of the Rb-82 tracer is achieved in the regions of BBB disruption. Of 7 patients studied, 6 showed Rb uptake in the lesions. Contrast enhancement on x-ray computed tomography was seen in 4 of the 6 patients. The CT image of the remaining patient, whose lesion did not take up Rb, showed no contrast enhancement. The results of our study show that this technique is a sensitive and accurate method to evaluate the BBB integrity in brain tumor patients. (no Refs)

6. SCINTIGRAPHIC INVESTIGATIONS IN CHILDREN WITH CENTRAL NERVOUS SYSTEM NEOPLASMS.

Kryst-Widzgowska T, Traczynska H
Zaklad Neuroradiologii, Instytut Psychoneurologiczny, Al. Sobieskiego 1/9, 02-957 Warsaw, Poland
Pediatr Pol; 56(8):897-901 1981

Brain scintigraphic examinations were performed in 82 children with verified CNS tumors. Thirty-seven children had supratentorial tumors, 45 subtentorial tumors. The scintigraphic findings were positive in 31/37 patients with supratentorial tumors: in 10/12 patients with tumors of the cerebral hemispheres, in 9/11 with tumors of the deep structures, in 7/9 with tumors of the optic chiasma, and in 5/5 with tumor of the

supraselIar tumors. The scintigraphic findings were positive in 34/45 patients with subtentorial tumors: in 5/8 with tumors of the fourth ventricle, in 26/68 with tumors of the vermis cerebelli and cerebellar hemispheres, in 0/4 with tumors of the brainstem, and in 0/2 with tumors of nonspecific localization. The findings indicate the high accuracy of scintigraphy in the diagnosis of tumors of the supratentorial region ad posterior cranial fossa and the limited usefulness of this method in the diagnosis of brainstem tumors. (8 Refs) (In POL)

7. CORRELATION BETWEEN RADIONUCLIDES UPTAKE AND ULTRASTRUCTURAL FEATURES OF TIGHT JUNCTIONS IN THE CAPILLARY WALL OF MENINGIOMAS.

Bar-Scila P, Front D, Peyser E, Talmon A, Israel O, Nir I
(c/o Front) Div. Nuclear Medicine, Rambam Medical Center, Haifa 35254, Israel
J Neurol Neurosurg Psychiatry; 44(11):1024-1028 1981

The uptake of Tc-99m pertechnetate and Co-57 bleomycin and the ultrastructure of small blood vessels were studied in 10 cases of meningioma. When thin sections of 120 contact areas between adjacent endothelial cells were examined, 92% of the intercellular contacts contained one to three punctate tight junctions. Freeze fracture preparations revealed fascia occludens with one to four sealing strands. These findings are consistent with the high permeability the meningiomas displayed for both of the radiopharmaceuticals. (Author abstract) (16 Refs)

DIGESTIVE NEOPLASMS

8. LOCALIZATION OF SUB-CLINICAL METASTASES OF COLORECTAL CARCINOMA BY RADIOIMMUNODETECTION (MEETING ABSTRACT).

Begent RH, Keep PA, Searle F, Dent J, Bagshawe KD, Jewkes RF, Jones BE, Vernon P
Departments of Medical Oncology and Nuclear Medicine, Charing Cross Hospital, London W6 8RF, England
UICC Conference on Clinical Oncology, October 28-31, 1981, Lausanne, Switzerland. International Union Against Cancer 131 pp., 1981.

Carcinomas of the colon and rectum can be localized by external scintigraphy after injection of 131 Iodine labelled antibody to carcinoembryonic antigen (CEA). It remains to be shown whether this method, Radioimmunodetection (RID) is sufficiently sensitive or specific to be clinically useful and this study describes investigation of 10 patients in whom recurrence after apparently curative resection was suspected because of abnormal serum CEA values. RID was performed by the method of Goldenberg et al in 10 such patients who had no clinical evidence of recurrence. RID was positive in 9, the sites being liver 3, liver and colon 1, liver and paraaortic nodes 1, liver and retrovesical area 1, perineum 1, bone 1, paracolic area 1. Intensive investigation of these sites subsequently led to unequivocal confirmation of the site of recurrence in 6 patients (4 by computerized tomography, 1 by ultrasound and 1 by surgery). These preliminary results suggest that RID may be of use in localization of early recurrence of colorectal cancer, being relevant to selection of patients for second-look surgery. (1 Ref)

9. IN VIVO RADIOIMMUNODETECTION OF OCCULT RECURRENT COLONIC CARCINOMA.

DeLand FH, Kim EE, Primus FJ, Kane ME, Goldenberg DM
Veterans Admin., Lexington, KY, 40536
AJR; 138(1):145-148 1982

External imaging of radionuclide-labeled antibodies to carcinoembryonic antigen (CEA) was used to detect and localize metastatic carcinoma in a 57-yr-old woman with a rising and markedly elevated plasma CEA level 5 mo after anterior resection of an adenocarcinoma of the sigmoid colon. Other extensive radionuclide evaluations were not helpful in determining the cause plasma CEA elevation. The value of in vivo radioimmunodetection for the demonstration of CEA-containing neoplasms is discussed. (16 Refs)

10. COLORECTAL CARCINOMA: EVIDENCE FOR CIRCULATING CEA-ANTI-CEA COMPLEXES (MEETING ABSTRACT).

Mavligit G, Stuckey S
University of Texas System Cancer Center, M.D. Anderson Hospital and, Tumor Institute Houston, TX
UICC Conference on Clinical Oncology, October 28-31, 1981, Lausanne, Switzerland. International Union Against Cancer 131 pp., 1981.

Despite the increasing usefulness of serial plasma CEA (carcinoembryonic antigen) determination in monitoring patients with subclinical colorectal cancer, a rising CEA as measured by the conventional radioimmunassay can only be expected in approx 70% of clinically documented cases with recurrent disease. Lack of CEA production by, or release from the growing tumor, and, perhaps a modification in its antigenic moiety rendering it nonassayable were all advocated as tentative explanations. Recent studies by Staab, et al, provided strong evidence in support of the presence of circulating CEA-anti-CEA complexes. We surmised that a presplitting of such putative CEA-anti-CEA complexes in a given plasma sample must result in a higher measurable CEA. Furthermore, the eluted anti-CEA from the splitting procedure must rebind purified CEA. Plasma samples were eluted with 2.5 M MgCl2 and the IgG component was then precipitated out by Protein A. Significant increments in measurable CEA were effected in 11 of 15 patients with disseminated colorecta l cancer and in five of ten patients with the Duke's C category. Complex-released IgG from a patients with a higher MgCl(2)-induced CEA increment effected a greater specific binding of I125-CEA than a similar IgG eluate from a patient with a negligible CEA increment. Our data suggest that CEA is autoimmunogenic and may result in circulating CEA-anti-CEA complex formation. (no Refs)

11. ASSOCIATION OF CEA TEST AND LIVER SCAN IN DETECTION OF HEPATIC METASTASES OF GASTROINTESTINAL CARCINOMA.

Buraggi GL, Bombardieri E, Castellani MR, Rodari A, Crippa F
Divisione di Medicina Nucleare, Instituto Nazionale Tumori, Via Venezian 1, 20133 Milan, Italy
Tumori; 67(6):553-558 1981

The authors evaluate the combined use of liver scan and the CEA test in the diagnosis of hepatic metastases of carcinoma of the gastrointestinal tract. Association of the two tests is justified by the fact that the liver scan is very specific but not very sensitive, whereas the CEA test is more sensitive and not very specific. The sensitivity of the CEA test, on the other hand, can be increased by increasing the threshold of normality. However, the associated diagnostic use of the liver scan

and the CEA test gives a loss of specificity with respect to the use of the liver scan alone. The present study, carried out on a series of 376 patients affected by gastrointestinal tumors of which 79 were of the stomach (9 with hepatic metastases), 133 of the colon and higher sigmoid (25 with hepatic metastases), and 164 of the lower sigmoid and rectum (29 with hepatic metastases), proposed to establish by use of a statistical method the optimal threshold of the CEA test that would give the best diagnostic specificity of the combined CEA test and liver scan without any relevant loss of sensitivity. A threshold of 26 ng/ml of the CEA test gave a specificity of 92%, a sensitivity of 80%, and an accuracy of 90%. The authors think that in the detection of liver metastases of gastrointestinal tumors, the combined test can be more helpful the less the probability, for a given patient, for other metastatic localizations. (Author abstract) (26 Refs)

12. NUCLEAR MAGNETIC RESONANCE IMAGING OF THE LIVER: INITIAL EXPERIENCE.

Doyle FH, Pennock JM, Banks LM, McDonnell MJ, Bydder GM, Steiner RE, Young IR, Clarke GJ, Pasmore T, Gilderdale DJ
(c/o Steiner) Dept. Diagnostic Radiology, Royal Postgraduate Medical Sch., Hammersmith Hosp., Ducane Road, London W12 OHS, England
AJR; 138(2):193-200 1982

Nuclear magnetic resonance (NMR) scans of the liver were obtained in 12 normal volunteers and 32 patients using a whole-body machine developed by Thorn-EMI Ltd, and the results were compared with x-ray computed tomography (CT). Two types of NMR scan, saturation-recovery and inversion-recovery, were performed in order to obtain values for the spin-lattice relaxation time, T1. Although the saturati on-recovery scans show little soft-tissue detail, the inversion-recovery scans demonstrated the interlobar fissure, hepatic veins, portal veins, bile ducts, and gallbladder. In comparison with CT (Siemens Somatom 2), both types of NMR scan showed some blurring due to respiratory movement but much less linear artifact across the liver from the air-fluid interface in the stomach. Focal disease within the liver was demonstrated by both CT and NMR, although an area of focal atrophy and another of hepatic infarction were only recognized with NMR. In diffuse disease the pattern varied. In steatosis CT was virtually diagnostic, while NMR showed no specific features. In hemochromatosis, hepatitis, eight cases of cirrhosis, and one of Wilson disease, both techniques showed abnormalities of varying specificity. In two cases of cirrhosis and one of primary biliary cirrhosis, only the NMR scan was abnormal. Nuclear magnetic resonance images are now sufficiently anatomically detailed to permit serious comparisons with technically advanced computed tomography. The information revealed is fundamentally different and can be expected to have some diagnostic utility. (Author abstract) (9 Refs)

13. IS THERE ANY JUSTIFICATION TO THE SCINTIGRAPHY AND ECHOTOMOGRAPHY B ASSOCIATION FOR THE TRACKING DOWN OF HEPATIC METASTASES?.

Boucherie JC, Morand L, Paillard J, Vallee D, Plainfosse MC, Alexandre JH, Baillet J
Service de Chirurgie Generale et Digestive, Hopital Broussais, 96, ru Didot, 75014 Paris, France
Sem Hop Paris; 58(4):250-252 1982

Regarding the tracking down of hepatic metastases, a study was made on 58 patients presenting either digestive or genital adenocarcinoma. The determining criterion of selection was the carrying out of the three following tests within the same mo (Technetium 99 Scintigraphy, Echotomography B and surgery). The global breakdown of exact answers is in favor of echography (72% against 53%), echography being more reliable than scintigraphy. Therefore echotomography B seems to be the first morphological method that should be proposed; and for improving the tracking down, scintigraphy makes the interpretation of the results more difficult, and reduces the number of correct answers. (Author abstract) (11 Refs) (In FRE)

14. CANDIDIASIS OF THE LIVER AND SPLEEN IN CHILDHOOD.

Miller JH, Greenfield LD, Wald BR
Div. Nuclear Radiology and Diagnostic Ultrasound, Childrens Hosp. Los Angeles, 4650 Sunset Blvd., Los Angeles, CA, 90027
Radiology; 142(2):375-380 1982

Four children with acute leukemia and surgically documented candidiasis of the liver and/or spleen were examined with a combination of diagnostic imaging modalities including 99mTc-sulfur colloid and 67-Ga- citrate scintigraphy, gray-scale ultrasound, and body computed tomography (CT). Abnormalities were detected in every individual examined. 99mTx-sulfur colloid scintigraphy revealed 'cold' ares in the liver or spleen. With 67Ga scintigraphy, these areas were 'cold' in some individuals and 'hot' in others. Gray-scale ultrasound demonstrated hypoechoic lesions with central areas of increased echogenicity in hepatic involvement, and hypoechoic replacement of the spleen in splenic involvement. CT in one patient revealed low-density areas without contrast enhancement within the hepatic parenchyma and unsuspected renal involvement. (Author abstract) (7 Refs)

15. CURRENT STATUS OF RADIOCOLLOID HEPATIC SCINTIPHOTOGRAPHY FOR SPACE-OCCUPYING DISEASE.

Drum DE
Dept. Radiology, Brigham and Women's Hosp., 75 Francis St., Boston, MA, 02115
Semin Nucl Med; 12(1):64-74 1982

Radionuclide scintiphotography with 99mTc-sulfur-colloid is the primary evaluative procedure for patients who may have mass lesions of the liver. This status arises from the combined features of wide availability, excellent sensitivity, ease of data collection, adaptability to patient variables, and wealth of clinical experience. Once detected, a locus of focal disease should be pursued to histologic certainty with clinically appropriate rapidity. Radiocolloid scintigraphy will become even more useful when nuclear medicine physicians refine their criteria for interpretation, modernize their equipment, and improve communications with referring physicians. (Author abstract) (21 Refs)

16. SCINTIGRAPHIC EVALUATION OF DIFFUSE HEPATIC DISEASE.

Waxman AD
Div. Nuclear Medicine, Cedars-Sinai Medical Center, 8700 Beverly Blvd., Los Angeles, CA, 90048
Semin Nucl Med; 12(1):75-88 1982

Multiple etiologies for diffuse hepatic disease have been described. The impact of these processes on hepatic scintigraphy and tracer kinetics should be understood by the nuclear medicine physician so as best to advise the clinician as to the potential etiologies of the disease process, and the severity, chroni-

city, and prognosis as well. Insight into pathophysiologic processes of the liver can be gained through the understanding of kinetic and scintigraphic information in specific disease states. Future technologic advances may enhance our ability to understand hepatic disorders more completely, thus benefiting and patient, the clinician, and the research scientist. (Author abstract) (100 Refs)

17. GIANT SOLITARY LIVER ADENOMA.

Dasaev AN, Zhdanov VS, Tarasov NF, Petukhov ND
Moscow, USSR
Klin Med (Mosk); 59(11):95-98 1981

Incidence, complications, and diagnosis of hepatocellular adenomas are briefly reviewed, and the case history of a 75-yr-old man is presented. Diagnostic examination included scintigraphy with 99mTc-colloid, 75Se-methionine, and 99mTc-HIDA, x-ray of abdominal and esophageal regions, and esophagogastroduodenoscopy. Clinical diagnosis was of a tumor of left liver lobe. At surgery, a 18 x 17 x 12 cm tumor was observed in the left lobe. The patient underwent left hepatectomy. Histological diagnosis was of benign hepatocellular adenoma. At control examination (1-yr-and-2-mo later), the patient was free of disease. (23 Refs) (In RUS)

18. A DICHOTOMY IN HEPATIC UPTAKE OF 99MTC-IDA AND 99MTC-COLLOID.

Lamki L
Victoria Hosp., London, Ontario, N6A 4G5, Canada
Semin Nucl Med; 12(1):92-94 1982

The case history of a 60-yr-old man with wt loss, jaundice, hepatomegaly, and liver dysfunction is reported. A 99mTc tin colloid scintigraphy showed 'cold' area in the right liver lobe, but the 99mTc-dimethylimino-diacetic acid (IDA) scan was relatively normal. The clinical diagnosis was of hepatoma, and the patient was subjected to laparotomy. Open liver biopsy showed active cirrhosis without any evidence of malignancy. The differences in the results of the two scans were explained by the differential uptake of IDA by hepatocytes and of tin colloid by Kupffer cells. (19 Refs)

19. QUANTITATION OF BLOOD LOSS FROM COLORECTAL CANCERS USING CR51 TAGGED ERYTHROCYTES (MEETING ABSTRACT).

Strawitz JG, Kanski JR
American Oncologic Hospital, Philadelphia, PA
UICC Conference on Clinical Oncology, October 28-31, 1981, Lausanne, Switzerland. International Union Against Cancer 131 pp., 1981.

The study includes twenty-three patients with seven 'normal' patients serving as controls and sixteen patients with proven colorectal cancer forming the lesion group. Study patients received 50 ml of their own previously drawn blood containing 50 mc of Cr-51. Stool collections began 24 hr later and continued daily for three to seven days. All specimens were counted in a scintillation counter after appropriate preparation. The results showed that the control group lost 1.58 cc of blood daily. The patients with known colorectal cancer shed blood in a variable fashion. Patients with right sided lesions bled more consistently while those with left sided tumors exhibited greater variability. The study suggests that the appearance of blood in the stool is a significant event but that patients with colorectal cancers show variability in bleeding and a high percentage of false negative values. This data will be discussed in relationship to the current use of occult blood testing as a detection method. (no Refs)

ENDOCRINE NEOPLASMS

20. RADIOIODINE TOTAL BODY SCAN VERSUS SERUM THYROGLOBULIN LEVELS IN FOLLOW-UP OF PATIENTS WITH THYROID CANCER.

Colacchio TA, LoGerfo P, Colacchio DA, Feind C
Dept. Surgery, Coll. Physicians and Surgeons of Columbia Univ., New York, NY
Surgery; 91(1):42-45 1982

Two groups of patients were studied to compare the efficacy of serum thyroglobul in (Tg) levels to 131I total body scans in the follow-up of patients with thyroid cancer. All of the group of 30 patients without recurrence had undetectable Tg levels both on and off thyroid hormone replacement, and all had negative total body scan results although 8 patients, showed uptake in remnant thyroid tissue. In the second group of 37 patients with documented recurrent or metastasis disease, 34 (92%) had positive serum Tg levels, although the levels in 5 of these patients were undetectable while on thyroid replacement, and 31 (84%) had positive total body scan results. The false negative results of the two tests were not overlapping, and of those with positive Tg levels, 29 showed a significant increase once thyroid hormone therapy had been withdrawn. We conclude that although the percentages of positive Tg levels and body scan results in patients with recurrent disease are similar, both tests are required to minimize the number of patients with undiagnosed metastases. Second, thyroid-stimulating hormone suppression has a definite although unpredictable effect on serum Tg levels in patients with thyroid cancer, and thyroid hormone should be withdrawn prior to measurement of serum Tg to minimize the number of false negative results. (Author abstract) (13 Refs)

21. COMPARISON OF 30-AND 50-MCI DOSES OF IODINE-131 FOR THYROID ABLATION.

Degroot LJ, Reilly M
Univ. Chicago, Box 138, 950 East 59th St., Chicago, IL, 60637
Ann Intern Med; 96(1):51-53 1982

We compared the utility of lower (30 mCi) and higher (50 to 60 mCi) doses of 131I, used to ablate residual thyroid tissue after thyroidectomy for carcinoma. Whole body scans were done using 1 mCi 131I, 3 wk after withdrawal of triiodothyronine. Patients had received ablation therapy within 3 days after scanning, and one or more subsequent scans were analyzed. Forty-eight patients were treated to ablate residual thyroid tissue that was presumed to be normal. Among 18 patients given the lower dose of 131I as outpatient., 15 had successful ablation and three needed a second administration; all 30 patients treated with the higher dose had successful ablation. Seventeen additional patients, presumed to have residual cancer, received 50 to 150 mCi; and six needed treatment. Although one dose of 50 to 60 mCi 131I provides more certain ablation, use of the usually effective 30-mCi dose for initial ablation is justified by the convenience of outpatient administration, the lower expense, and the lower whole-body radiation dose. (Author abstract) (12 Refs)

22. EFFECTIVE FOCAL DOSAGE AND RADIATION LOAD DURING TREATMENT OF THYROID CANCER WITH IODINE RADIOISOTOPE.

Ivanitskaia VI, Shantyr' VI, Pudovkina LF, Kozhukhov VD
Res. Inst. Medical Radiology, Kharkov, USSR
Med Radiol (Mosk); 26(11):6-12 1981

To determine the effective doses of 131I for the treatment of thyroid cancer, 30 5 patients were reviewed. Tumor regression of 5-15 yr duration was achieved in 140/305 patients (22 men, 118 women; 19-73 yr old). Of 140 patients, 53 were in Stage II, 71 were in Stage III, and 16 were in Stage IV. The patients received 131I in combination with thyroidectomy or distant gamma therapy. Absorbed doses of 131I in the primary tumor and in lung metastases were 11,970 and 12,980 rads, respectively. Regression of lung metastases was observed in 26.5% of the patients treated with 131I after surgical removal of the thyroid, compared with 13.4% of the patients treated with 131I in combination with thyroid irradiation. Large lung metastases were more resistant to 131I than small disseminated lung metastases. The patients treated with 131I showed no impairment of liver and kidney functions. (16 Refs) (In RUS)

23. TREATMENT OF MEDULLARY CARCINOMA OF THE THYROID WITH I-131.

Nusynowitz ML, Pollard E, Benedetto AR, Lecklitner ML, Ware RW
Dept. Radiology, Div. Nuclear Medicine, Univ. Texas Health Science Center at San Antonio, 7703 Floyd Curl Dr., San Antonio, TX, 78284
J Nucl Med; 23(2):143-146 1982

We present a patient with radioiodine concentration in pulmonary metastases presumably arising from medullary carcinoma of the thyroid. Transient symptomatic improvement occurred after treatment with a large dose of sodium iodide (I-131). Although radioiodine concentration in medullary carcinoma of the thyroid is rare, the findings in this patient and in other recent reports suggest that an attempt should be made to determine whether a medullary carcinoma concentrates radioiodine. If so, I-131 treatment might be beneficial. (Author abstract) (13 Refs)

24. SINGLE THYROID NODULES AND THYROID CANCER (MEETING ABSTRACT).

Van Zyl JA, Bouwer EL, Sandler M
Department of Surgery, University Stellenbosch, Tygerberg Hospital, Stellenbosch, South Africa
UICC Conference on Clinical Oncology, October 28-31, 1981, Lausanne, Switzerland. International Union Against Cancer 131 pp., 1981.

A review study was carried out on 236 cases presenting with clinically single thyroid nodules and on 65 thyroid cancers, seen over a 7 yr period, to ascertain whether any change in treatment policy was indicated. The histological findings in these 236 cases were as follows; colloid nodules and cysts 145, adenomas 47, thyroiditis 5, and carcinoma 40. In the age group 60-79 the incidence of single nodules was 10%, but the incidence of carcinoma was higher at 23%. Clinical evaluation and scintigraphic studies are not entirely reliable indicating a positive diagnosis for carcinoma in only 5, advanced cases. The histological spectrum of the 65 carcinomata was in accordance with those described in most series. The importance of diarrhea and calcitonin determinations as indicative of medullary carcinoma is discussed in 2 cases. Treatment consisted of lobectomy and resection of the isthmus in 18, biopsy only in 5 and total thyroidectomy in 42 while cervical block dissection was performed in 5 instances. To date only 3 of 5 patients with advanced carcinoma, and 2 with medullary carcinoma have died. Our results justify a policy of exploration for possible carcinoma in all cases of single thyroid nodules except in those which can be classified as 'hot' nodules. Acknowledging the limited numbers and the relatively short follow-up, our results favor lobectomy for papillary and follicular carcinoma and total thyroidectomy for medullary carcinoma. The indications for total thyroidectomy is the presence of lymph node involvement and/or clinical involvement of the contra-lateral lobe at the time of operation. (no Refs)

25. DISPARATE THYROID IMAGING WITH 99MTC PERTECHNETATE AND RADIOIODINE.

Koppers B
Nuklearmedizinische Klinik und Poliklinik rechts der Isar, Technische Universitat Munchen, Ismaninger Str. 22, D-8000 Munchen 80, W. Germany
ROEFO; 135(6):717-720 1981

Description of a case with disparate thyroid imaging with 99mTc pertechnetate and radioiodine. References and brief discussion of diagnostic possibilities in case of such a finding. (Author abstract) (18 Refs) (In GER)

GENITOURINARY NEOPLASMS

26. RADIOGRAPHIC AND SCINTIGRAPHIC APPEARANCE OF BONE METASTASIZING WILMS' TUMOUR: PROBLEMS IN CONFIRMING DIAGNOSIS.

Appell RG, Brandeis WE, Georgi P, Van Kaick G, Bolkenius M, Ludwig R, Oppermann HC, Willich E
Universitatskinderklinik, Im Neuenheimer Feld 150, D-6900 Heidelberg 1, W. Germany
Ann Radiol (Paris); 25(1):14-18 1982

Bone metastasizing Wilms' tumor is a rare entity. We describe three patients with this condition. Confirming diagnosis was difficult, because radiography and scintigraphy yielded different results. In the first patient, x-rays showed an osteolytic lesion in the mandible, whereas scintigraphy demonstrated a cold lesion. In the second patient, differentiation between inflammatory and neoplastic bone alteration was impossible by radiography and scintigraphy. The third patient developed two metastases in the skull. One lesion showed an increased uptake of the radionuclide, whereas the other was unsuspicious in bone scan. On CT, tumor invasion of muscular structures could be demonstrated. Suspicion of bone lesions in Wilms' tumor must be confirmed by different methods. Reevaluation of histology is necessary. (Author abstract) (17 Refs)

HEAD AND NECK NEOPLASMS

27. TUMOR SCINTIGRAPHY IN PATIENTS WITH MALIGNANT TUMORS OF THE HEAD AND NECK.

Bier J, Schwartz L, Koppenhagen K
Klinik fur Kiefer- und Plastische Gesichtschirurgie, Klinikum Steglitz der Freien Universitat Berlin, Hindenburgdamm 30, D-1000 Berlin 45, W. Germany
Dtsch Zahnaerztl Z; 36(11):752-754 1981

Scintigraphic examination was performed on 124 patients with malignant tumors of the head and neck [107 squamous cell carcinomas (SCC), 22 sarcomas, and six adenocystic carcinomas]. A total of 149 scans were performed, including 85 whole-body scans and 64 organ scans. Images were produced with a gamma camera. Radiopharmaceuticals used included 99Tc-methylene-diphosphonate (TMD), 57Co-bleomycin (CB), and other compounds. Patients with SCC were evaluated with TMD for changes in bone structure or with CB for changes in soft tissue. A total of 234 findings were obtained for primary tumor regions, cervical lymph node regions, and questionable distant metastases. In 30 cases positive scintigraphic findings correlated with positive clinical findings. In 23 cases clinical findings were positive, but scintigraphic findings were negative. Both clinical and scintigraphic findings were negative in 154 cases. Twenty scintigrams were not evaluable. In seven cases scintigraphic findings were positive and clinical findings were negative. Of these seven cases clinical findings were false in only three. Scintigraphy thus produced clinically relevant determinations in only 1.3% of all procedures and is therefore not recommended as a routine procedure for cancers of the head and neck. (no Refs) (In GER)

28. THE VALUE OF 57CO-BLEOMYCINE-SCINTIGRAPHY IN THE DIAGNOSIS AND STAGING OF SQUAMOUS CEL CARCINOMA IN THE HEAD AND NECK REGION (MEETING ABSTRACT).

Wespi H, Marincic D, Bekier A
Department of Otolaryngology and Maxillofacial Surgery, Kantonsspital St. Gallen, St. Gallen, Switzerland
UICC Conference on Clinical Oncology, October 28-31, 1981, Lausanne, Switzerland. International Union Against Cancer 131 pp., 1981.

In more than 60 patients with tumors in the head and neck region 15 mg of 57Co-Bleomycin with 1 mCi radioactivity were injected iv. We were thus able to stage, determine the histology of the tumor and detect recurrences. Exact electrophoretic examinations showed that more than 95% of the radioactivity was bound to the bleomycin molecule. The scintigraphic results correlated to a high degree with the clinical and intraoperative findings. The described method is therefore not only suited for diagnostic purposes, but also for the follow-up of squamous cell carcinoma. No additional stress is placed on the patient. (no Refs)

29. BONE SCANNING IN THE ASSESSMENT OF MANDIBULAR INVASION BY ORAL CAVITY CARCINOMAS.

Weisman RA, Kimmelman CP
Dept. Otorhinolaryngology, Univ. Pennsylvania, 3400 Spruce St., Philadelphia, PA, 19104
Laryngoscope; 92(1):1-4 1982

Mandibular invasion alters the staging and treatment of oral cavity squamous cell carcinoma, and thus its detection is essential to the head and neck oncologist. There is little information assessing the accuracy of the radionuclide bone scan and the roentgenogram in determining mandibular invasion. The present study reports data on 40 patients with squamous cell carcinoma of the oral cavity for whom bone scans, mandibular roentgenograms, and histologic examination of the mandible were available. The bone scan correctly predicted mandibular invasion in 8 of 9 cases; the false positive rate was 53% as a result of mandibular inflammatory changes. The bone scan was more accurate than the roentgenogram in predicting tumor invasion of the mandible, but the bone scan had a higher false positive rate. A normal bone scan and roentgenogram virtually precluded tumor involvement of the mandible. We conclude that the bone scan is an important adjunct in the prediction of carcinomatous invasion of the mandible in squamous cell carcinoma of the oral cavity. (Author abstract) (9 Refs)

30. USE OF 111IN-BLEOMYCIN FOR RADIONUCLIDE DIAGNOSIS OF TUMORS OF THE OROPHARYNX AND PARAPHARYNGEAL SPACE.

Davudov KhSh, Nasyrov VA, Akopian RG, Krotkov FF
Municipal Clinical Hosp. No. 67, Moscow, USSR
Zh Ushn Nos Gorl Bolezn; (6):5-8 1981

Diagnostic efficacy of scintigraphy with 111In-bleomycin was studied in 31 patients (20 men, 11 women; 22-83 yr old) with malignant and benign lesions of the oropharynx and parapharyngeal space. Histologically, 14 patients had squamous cell keratinizing carcinoma, 8 had squamous cell nonkeratinizing carcinoma, 2 had malignant lymphoma, 2 had malignant chemodectoma, 1 had fibrosarcoma, 2 had giant hemangioma, 1 had lipoma, and 1 had osteoma. Of 27 patients with malignant tumors, 22 showed accumulation of the radionuclide in the region of the pharynx. In five patients, the results of scintigraphy were false negative. There was no accumulation of 111In-bleomycin in the patients with benign tumors. (5 Refs) (In RUS)

31. FACIAL BONE SCINTIGRAPHY VIII. DIAGNOSIS OF MALIGNANT LESIONS IN THE MAXILLARY, ETHMOIDAL AND PALATAL BONES.

Bergstedt HF, Lind MG
Dept. Diagnostic Radiology and Otolaryngology, Karolinska Sjukhuset, S-104 01 Stockholm, Sweden
Acta Radiol [Diagn] (Stockh); 22(5):609-618 1981

The results from radiographic and scintigraphic examination of 28 patients with malignant tumors of the nasal, paranasal and palate regions, 23 patients with purulent maxillary sinusitis, and 15 control cases were compared. A combination of radiography and scintigraphy yielded the best information on the differentiation between an inflammatory condition and malignant tumor and the extent of malignant growth in adjacent bone. (Author abstract) (29 Refs)

HEMATOLOGIC, RETICULOENDOTHELIAL, AND LYMPHATIC NEOPLASMS

32. DYNAMIC STUDIES OF 111-INDIUM LABELED LYMPHOCYTES AFTER TREATMENT WITH HYBRIDOMA MONOCLONAL ANTIBODY (MEETING ABSTRACT).

McDougall IR, Goris ML, Miller RA
Stanford University School of Medicine, Stanford, CA
Clin Nucl Med; 6(9S):452 1981

A 67 year old male with progressive cutaneous T cell lymphoma had failed to respond to systemic chemotherapy and electron beam therapy. He was treated on an experimental protocol using a mouse Ig G2a monoclonal antibody which reacts with a normal human T cell differentiation antigen present on Sezary cells. At the time of treatment with 1 mg of antibody, his peripheral white blood count was 8,300 with 1,100 malignant cells. The lymphocytes from 40 ml venous blood were separated over ficoll hypaque and labeled with 111-Indium Oxine (150 uCi). Serial blood radioactivity and whole body scans were made before, immediately after and 18 hours after infusion of antibody. There was an immediate drop in malignant white cells to 70/mm-3, blood radioactivity dropped by 50% and there was remarkable redistribution of radioactivity in internal organs. The study demonstrates hepatic accumulation of radioactivity and clearance of blood activity (labeled lymphocytes) immediately after infusion of monoclonal antibody. The results suggest that the hepatic reticulo-endothelial system is involved in the removal of cells and that antitumor antibodies have therapeutic potential. (no Refs)

33. DIAGNOSIS AND TREATMENT OF CHRONIC MONOCYTIC LEUKEMIA (MEETING ABSTRACT).

Fleischer J
Abteilung fur Hamatologie der Medizinischen Klinik der Medizinischen, Akademie Dresden, E. Germany
Ninth Congress of the Haematological Society, October 1-3, 1981, Debrecen, Hungary. The Society 175 pp., 1981.

Myelomonocytic leukemia must be distinguished from purely monocytic forms of chronic monocytic leukemia. The myelomonocytic variety is more common than the monocytic form. Atypical erythropoietic and thrombocytopoietic cell forms can be found. Most authors differentiate between subacute and chronic leukemia on the basis of duration of the disease. Differentiation on the basis of maturation seems more suitable. In accordance with Geory's data and our own experience up to 20% blasts is acceptable for the subacute form and 20-50% for the chronic form. In the myelomonocytic form a few cells are nonspecific-esterase positive and hence monocytic, others clearly naphthol-AS-D chloroacetate esterase positive and thus granulocytic. Determination of serum and urine lysozyme is of value especially when non-specific esterase activity is not definitely elevated. Elevations are usually greater in forms displaying immature cells. A distinctly abundant blast increase usually leads rapidly to death. In our own case series of 7 chronic myelomonocytic or monocytic leukemias 3 out of the 5 who died had a blast increase. According to Meuret the motility, phagocytic activity and differentiation potential of leukemic monocytes are normal. Activated complement and Fc-receptors are found in chronic monocytic leukemia. In following up 3 patients for several yr we discovered a reduction in the index value for the PAS reaction and a transitory drop in nonspecific esterase activity. Peak incidence is between 65 and 75 yr old. The spleen is enlarged in only one-third of the patients. Hepatomegaly is not very pronounced; only sporadic subcutaneous or submucosal leukemic infiltrate which we observed in just one patient. Hyperuricemia or gout may develop. Two of our patients were tested with 113m-indium colloid and 99m-Tc-labeled aged erythrocytes. One showed an accelerated uptake of indium colloid in the liver, the other a high concentration of colloid in an enlarged liver and delayed elimination of the aged erythrocytes in the spleen. (no Refs) (In GER)

34. GALLIUM UPTAKE IN LYMPHOMATOID GRANULOMATOSIS OF THE LUNG.

Woodring JH, Poulos A, Kim EE, Mostowycz L
Dept. Diagnostic Radiology, Univ. Kentucky Medical Center, Lexington, KY, 40536
AJR; 138(1):160-161 1982

Lymphomatoid granulomatosis is a rare disorder that resembles both malignant lymphoma and Wegener granulomatosis. The disease most often presents in the lungs as multiple nodular opacities; less commonly a solitary mass density may occur. Hilar adenopathy may also be present in 25% of cases. To our knowledge, affinity for gallium in these pulmonary lesions has not been previously reported. We describe a case of lymphomatoid granulomatosis of the lung in which the pulmonary parenchymal lesions showed significant gallium uptake. (Author abstract) (9 Refs)

35. METHODS OF RADIONUCLIDE LABELING OF LEUKOCYTES AND CLINICAL APPLICATIONS OF LABELED LEUKOCYTES.

Vorob'eva EN
No affiliation given
Med Radiol (Mosk); 26(11):81-86 1981

Methods of leukocytes labeling with various radioisotopes are reviewed. Leukocytes labeled with 32P-sodium diphosphate can be used for the study of kinetics of blood neutrophils. Leukocytes labeled with 67Ga or 99mTc-colloid sulfate are used for detection of abscesses. Neutrophils labeled with 111In-oxine are used in radionuclide diagnosis of myocardial infarction, while lymphocytes labeled with 111In-oxine can be used for visualization of the spleen, liver, cervical, mesenterial, and para-aortal lymph nodes in the patients with Hodgkin's disease. Indium radioisotopes can be used for internal irradiation of involved lymph nodes and spleen. Mixture of 111In and 113mIn can be used for local tumor irradiation. (52 Refs) (In RUS)

MUSCULOSKELETAL NEOPLASMS

36. IMAGING OF PRIMARY EWING SARCOMA WITH 13N-L-GLUTAMATE.

Reiman RE, Rosen G, Gelbard AS, Benua RS, Laughlin JS
Biophysics Lab., Memorial Sloan-Kettering Cancer Center, 1275 York Ave., New York, NY, 10021
Radiology; 142(2):495-500 1982

Eleven patients with untreated primary Ewing sarcoma were studied with intraveno usly administered 13N-labeled L-glutamate. Seven were repeatedly scanned during chemotherapy using this agent and 99mTc-methylene diphosphonate (99mTc-MDP). The untreated primary tumor was distinctly visualized with 13N-L-glutamate in all cases; the distribution of 13N label in the tumor sometimes differed from that of 99mTc. A kinetic

study showed rapid uptake of 13N by tumor tissue. Repeat scans following therapy indicated that 13N-L-glutamate and 99mTc-MDP uptake showed changes consistent with histological findings following subsequent surgery. 13N uptake often decreased more markedly than 99mTc uptake during chemotherapy, but metastatic lesions were not visualized with 13N-L-glutamate. Tumor imaging with this labeled amino acid may be of value in assessing the response of primary Ewing sarcoma to chemotherapy. (Author abstract) (12 Refs)

37. YTTRIUM-90 FOR TREATMENT OF PAIN FROM BONE METASTASES.

Kutzner J, Dahnert W, Schreyer T, Grimm W, Brod KH, Becker M
Institut fur Klinische Strahlenkunde, Johannes-Gutenberg-Universitat, Langenbeckstrasse 1, D-6500 Mainz, W. Germany
Nuklearmedizin; 20(5):229-235 1981

Yttrium-90 (Y-90) was tested as an analgesic for pain from bone metastases. Y-90 was purified by elution on an 90Sr-absorbing artificial resin 'cow'. Sixteen patients received 1-14.4 mCi Y-90 as a citrate complex in fractioned doses of 1-4.1 mCi. Patients included eight with prostate carcinoma and four with mammary carcinoma. All patients experienced good to excellent reduction of pain, beginning approx 4.5 days after start of treatment and lasting an av of greater than 7 wk. No hematologic changes, radiation reaction, or other side effects were noted. Body retention of Y-90 was greater than 80%. With a half-life of 64.5 hr, Y-90 presented less radiation hazard than 90Sr. Y-90 took effect more rapidly than 90Sr, 70% of the total dose being effective after 4.5 days. Only 10% of 90Sr dose was effective after 4.5 days. The av duration of the analgesic effect was approx the same for Y-90 and 90Sr. Tolerance dose for a single application of Y-90 was 1-2 mCi/kg body wt. Environmental contamination due to excretion of Y-90 by patients after release from hospital was well below the established safety standards. The cost of Y-90 treatment was less than that for 90-Sr. (21 Refs) (In GER)

RESPIRATORY AND CARDIOVASCULAR NEOPLASMS

38. USE OF 67GA-CITRATE IN DIAGNOSIS OF LUNG CANCER.

Bogdasarov IuB, Zaitseva TI, Gabuniia RI, Abramov VF
All-Union Cancer Res. Center, Moscow, USSR
Med Radiol (Mosk); 26(11):37-41 1981

Diagnostic efficacy of scintigraphy with 67Ga-citrate was evaluated in 123 patients (118 men, 5 women; 36-70 yr old) with various lung diseases. Among these patients, 101 had lung cancer, 5 had benign lung tumors, 10 had pulmonary tuberculosis, and 7 had chronic inflammations. Of 101 lung cancer patients, 64 had central tumors and 37 had peripheral tumors; histologically, 67 had squamous cell carcinoma, 23 had adenocarcinoma, and 11 had nondifferentiated carcinoma. Accumulation of 67Ga-citrate in the tumor was detected in 87% of the patients with central lung cancer and in 89% of the patients with peripheral lung cancer. False negative results of the radionuclide examination were associated with small (1.5-2-cm) tumor size. Accumulation of 67Ga-citrate did not depend upon the histological variant of lung cancer. There was no accumulation of 67Ga-citrate in benign lung tumors or in the foci of nonspecific inflammation. (3 Refs) (In RUS)

MISCELLANEOUS

39. PHARMACOKINETIC EVALUATION OF RADIOLABELED ANTIBODY TO HCG FOR TUMOR IMAGING IN HUMANS (MEETING ABSTRACT).

Lyster DM, Morrison RT, Szasz I, Alcorn L, Rhodes B, Breslow K, Burchiel S
Vancouver General Hospital, Vancouver, British Columbia, Canada
Clin Nucl Med; 6(9S):453 1981

I-131 and Tc-99m labeled whole antibody and F(ab')2 fragments to human chorionic gonadotropin (hCG) were studied in 46 adult patients by imaging, probe counting and blood and urine analyses. One hundred and fifty ug of protein were administered iv labeled to 1.5 mCi I-131 or 15 mCi Tc-99m. No patient had an allergic or toxic reaction and two patients were injected on multiple occasions. Antibody fragments were cleared most rapidly in the blood. They also had max uptake in the kidneys and better tumor uptake than whole antibody. The technetium labeled F(ab')2 fragment proved to be superior as a tumor imaging agent. Although the biological half-life is greater in tumor as compared to normal tissue, the target to non-target ratio observed on imaging was suboptimal for tumor identification. This may be due to the low immunospecificity that this particular antibody demonstrates, despite a high affinity constant of 10-10M as calculated by radioimmunoassay. Subtraction techniques may improve image quality and allow for better visualization of lesions. (no Refs)

40. A DIFFERENCE BETWEEN PATIENTS WITH AND WITHOUT TUMOR UPTAKE OF RADIOGALLIUM.

Lentle BC, Garrecht B, Schmidt RP, Hill JR, Coates J, Noujaim AA, Camuzzini GF, Jackson FI
Cross Cancer Inst., 11560 University Ave., Edmonton, Alberta T6G 1Z2, Canada
Int J Nucl Med Biol; 8(4):267-270 1981

Because of the potential importance of the iron transport mechanism in tumor imaging with 67Ga-citrate, we have measured a number of the relevant variables in 150 unselected patients referred for imaging. These have been the serum iron, serum total iron binding capacity, latent iron binding capacity, transferrin, serum proteins, and phosphate by conventional methods and serum ferritin by radioassay. The images have been reviewed by two observers and recorded as positive (showing disease) or negativ e. The disease has been characterized as either inflammatory or neoplastic by review of the clinical biopsy and operative findings, which have also been used to designate the images true or false negative. When the 65 patients with cancer with true positive scans were compared with the 70 patients with negative scans, the mean serum iron concentrations were found to be lower in the first group (76 +-37 vs 101 +-40) (p less than 0.01); the mean transferrin concentrations were lower (245 +-60 vs 284 +-49) (p less than 0.01); and the mean ferritin concentrations higher (423 +-505 vs 202 +-217) (p less than 0.01). Because serum ferritin is reported to be a tumor marker it becomes important to compare the true positive (n = 65) and false negative groups. There are significantly lower mean concentrations of iron, total iron binding capacity, and transferrin and higher mean ferritin concentrations (p less than 0.01) in the positive group. (Author abstract) (14 Refs)

41. DIAGNOSTIC EVALUATION OF GALLIUM-67 SCANNING OF INTRATHORACICAL NEOPLASMS - CLINICAL AND EXPERIMENTAL RESULTS.

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Int J Nucl Med Biol; 8(4):295-302 1981

One hundred forty two patients suffering from bronchial carcinoma and 118 with Hodgkin's disease were examined scintigraphically by use of 67Ga-citrate. Additionally, in 31 patients with bronchial carcinoma the specific 67Ga concentration was determined in tissue samples of histomorphologically various tumors. One hundred thirty two of 142 (93%) of bronchial carcinomas demonstrated a significantly increased radiogallium accumulation by scintigraphy. No differences between differentiated and undifferentiated tumors could be observed. These clinical-scintigraphical results could be confirmed by direct measurement of 67Ga concentration in tumor tissue. Independent of the histomorphological type 67Ga concentration was found to be 20.3 +-6.7% kg-1 tumor tissue. Normal lung tissue yielded 3.2 +-1.6% kg-1 whereas necrotic tumor tissue containing up to 30% viable tumor cells, revealed 7.9 +-2.4% kg-1 of injected 67Ga. The comparison of x-ray and 67Ga scintigraphy showed concordant results (true-positive/true-negative) within the thorax region in 90.6% of the 84 untreated and in 93.6% of the 34 treated patients suffering from Hodgkin's disease. In the neck and thorax region only 0.5% false-positive and 4.2% false-negative findings were obtained. In untreated patients with one or more Hodgkin's lesions a focally increased 67Ga accumulation was detected in 81.2% but in treated patients only in 27.1%. Therapy resulted in a marked decrease in the number of scintigraphically detectable lymphomas. No significant difference in behavior of 67Ga accumulation could be observed in the various histomorphological types. Gallium-67 imaging is useful for determination of tumor size and extent in bronchial carcinoma as well as in intrathoracically situated Hodgkin's disease prior to therapy. After a tumor specific therapy gallium-67 scintigraphy is suitable for evaluation of the effectiveness of radiation or chemotherapy and for detection of recurrent lymphomas. (Author abstract) (23 Refs)

42. 67GA IMAGING INCORPORATING ADMINISTRATION OF IRON.

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Int J Nucl Med Biol; 8(4):341-348 1981

We describe further experience using a 67Ga procedure in which patients received im iron (up to 100 mg) at about 3 hr post 67Ga, whereupon imaging was performed first at 6 hr, then again at 48 hr. The administration of iron was intended to promote the clearance of 67Ga from th circulation and its more rapid accumulation in tumor, thus to enhance the effectiveness of the 6-hr examination. In several cases where it was possible to compare 6-hr images in the same patient, with and without iron, the superiority of +Fe sets was clearly demonstrated. In 76 investigations of patients with malignant lymphoma or seminoma testis, the combined 6-hr and 48-hr 67Ga examinations showed the presence of active disease in 34. In 31 of these, the principal disease foci were already evident in the 6-hr pictures. No complications arising from the administration of iron were noted. (Author abstract) (3 Refs)

43. CLINICAL APPLICATIONS OF GALLIUM IN ONCOLOGY.

Johnston GS

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Int J Nucl Med Biol; 8(4):249-255 1981

A variety of indicators or 'markers' are used in the practice of oncology for detecting the presence of malignancy. Such markers are of particular use in testing for response to therapy and the recurrence of tumor following successful therapy. Over the past decade, radionuclide imaging with gallium-67 has provided such a marker for a variety of malignancies and has gained wide acceptance as a diagnostic procedure. While much of the basis for this clinical application has been empirical, some careful studies have attested to the level of reliability for gallium imaging in patients with malignant tumors. Generally, the best procedure is to individualize each patient and obtain a whole-body gallium-67 scan as early as possible following the diagnosis of malignancy and before any therapy is instituted. This can be used to help determine how well the tumor will accept the marker and, therefore, how useful the procedure will be in a particular patient. The experience of the National Institutes of Health with gallium-67 imaging in oncology patients has been extensive over the past decade. This experience strongly favors the usefulness of gallium imaging in Oncology. (Author abstract) (18 Refs)

44. THE 'HOT SPLEEN' PHENOMENON IN METASTATIC MALIGNANT MELANOMA: ITS INCIDENCE AND RELATIONSHIP WITH THE IMMUNE SYSTEM.

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Cancer; 49(3):439-444 1982

Of patients with Stage II and III malignant melanoma, 34.7% display reversal of the liver-spleen ratio on technetium-99m-sulfur colloid isotope scans. Such an occurrence does not suggest a greater likelihood of relapse or a worse survival. The phenomenon is more common in female patients and there is a significant relationship between the presence of a 'hot spleen' and a high IgM level. Patients with Stage II disease and high IgM levels have relapses more quickly than do those with normal IgM levels. Lymphopenia is common in patients with Stage II and III disease and the survival of these patients is worse than that of those with normal lymphocyte counts. In this report, the data are discussed together with results from other investigations, and a unifying hypothesis is presented which explains the phenomenon and relates it to increased activity of macrophages as a result of the presence of the tumor. The usefulness of isotope liver scanning in Stage III malignant melanoma is also discussed. (Author abstract) (22 Refs)

45. A SIMPLE RADIOISOTOPE TECHNIQUE FOR ASSESSMENT OF DRUG INDUCED NEPHROTOXICITY (MEETING ABSTRACT).

ten Bokkel Huinink WW, Simonetti G, McVie JG

Netherlands Cancer Institute, Amsterdam, The Netherlands

UICC Conference on Clinical Oncology, October 28-31, 1981, Lausanne, Switzerland. International Union Against Cancer 131 pp., 1981.

A new radioisotope technique for assessment of nephrotoxicity has been developed and validated in patients (pts) receiving Cisplatin (CDDP). After iv injection of 50 uCi iothalamic acid (IOT) and 1 mCi hippuran (HIP) the relation between decay of activities, measured both by a scintillator on the fore-

arm and in plasma samples, and time was linear in 6 healthy controls. In 25 pts the influence of CDDP on this linear decay expressed as half time life has been studied in 38 experiments during constant infusion of saline. In all cases CDDP caused an immediate alteration in HIP half life and a lesser effect on IOT. If the half lives before and after CDDP are expressed as a ratio, an exact measure of change in IOT or HIP can be derived. Ratios over 2 were usual in HIP studies indicating a hundred percent slowing of excretion of HIP in the renal tubules. The av ratio for IOT was 1.5. Plasma samples measurements proved to be more sensitive than the external method; the latter being however sensitive enough to observe changes after 10 mg CDDP per hr. The method described assessed acute CDDP induced nephrotoxicity reproducibly and wit h more sensitivity than conventional methods. (no Refs)

46. INCREASED UPTAKE OF TECHNETIUM-99M-LABELED BONE IMAGING AGENTS IN THE KIDNEYS.

Siddiqui AR
Div. Nuclear Medicine, Indiana Univ. Medical Center, Indianapolis, IN, 46223
Semin Nucl Med; 12(1):101-102 1982

A 4-yr-old boy with a history of small cell sarcoma of the mandible developed systemic toxoplasmosis, which was treated with amphotericin-B. By an accident, the patient received an overdose of amphotericin. At routine metastatic evaluation, the bone scan with 99mTc-methylene diphosphonate showed kidney enlargement with diffusely increased uptake. Clinical diagnosis was of amphotericin-induced tubular necrosis. (25 Refs)

47. DEMONSTRATION AND FUNCTIONAL TESTING OF THE URETER WITH RADIOISOTOPES.

Philipp K
I. Universitats-Frauenklinik Wien, Spitalgasse 23, A-1090 Wien, Austria
Gynaekol Rundsch; 21(Suppl2):202-204 1981

The urokinetogram, a noninvasive method of studying ureteral function, is described. Following iv injection of 99mTc-MDP, the isotope is detected with a gamma-camera. Evaluation of data from 20 images produces a graphic demonstration of urinary transport as function of time over a 16-min interval. The method is suitable for demonstrating functional disorders of the ureter, particularly when pyelography and isotopic nephrography produce unexceptional results. (1 Ref) (In GER)

SELECTED PRE-CLINICAL STUDIES

48. SCINTIGRAPHY AND DISTRIBUTION OF LABELED ANTIBODIES IN RATS WITH TUMORS.

Sharp JG, Osborne JW, Cheng HF, Coop KL, Zimmerman GR
Radiation Res. Lab., Univ. Iowa, Iowa City, IA, 52242
Eur J Nucl Med; 7(1):28-34 1982

Experiments with in vivo localization of iv injected radiolabeled tumor antibodies (Ab) in Holtzman rats with an x-ray-induced mucoid adenocarcinoma of the intestine are described. Tumor antigen was induced in New Zealand white rabbits using tissue from several animals, and the rabbit serum globulins were separated by electrophoresis and labeled with 131I. Globulins receiving final electrophoretic and diffusion separation were called 'purified'; others were 'unpurified.' The distribution of 131I-labeled unpurified and purified Ab, 131I-labeled non-tumor-specific gamma globulin, and 131I-labeled serum albumin were studied in normal and tumor-bearing rats. Scanning was accomplished by rectilinear camera and gamma camera; tissue distribution of labeled material was determined by scintillation spectrometry of digested tissue samples. Comparison of scans revealed tumors greater than 2.0 g in mice receiving all three radio-labeled agents, but none showed tumors dependably when the tumors were less than 1.0 g. Localization of 131I-labeled Ab was variable, and useful levels of Ab were present in only a few cases. The presence of circulating tumor antigens capable of binding the Ab is responsible for much of the variability. (31 Refs)

49. CONCENTRATION OF GALLIUM-67 BY V79 MULTICELLULAR SPHEROIDS.

Driedger AA, Sutherland RM
Div. Nuclear Medicine, Ontario Cancer Treatment and Res. Foundation, Victoria Hosp., London, Ontario, Canada
Int J Nucl Med Biol; 8(4):223-230 1981

The concentration of gallium-67 by the V79 cell line was studied in the multicellular spheroid tumor model in tissue culture. The spheroids display histologic features and growth characteristics similar to those of a rapidly growing tumor that is outgrowing its blood supply. Max gallium concentration occurred in the spheroids in the presence of fresh growth medium but an energy requirement for gallium uptake could not be demonstrated. We concluded that the metabolites present in exhausted medium interfere with gallium uptake. During hypoxia the uptake was increased. Autoradiography showed that most of the gallium concentrated in hypoxic central zones of the spheroids. Dead spheroids had a markedly increased affinity for gallium and the preference for the central zones was eliminated. In these cells and under these conditions of culture gallium uptake is apparently related to permeability of cell membranes alone. Alterations in the cellular environment which may result in membrane injury increase the uptake. Hypoxic zones in rapidly growing tumors may be sites of preferred gallium uptake by mechanisms that are not related to transferrin-mediated gallium transport. (Author abstract) (9 Refs)

50. TUMOR UPTAKES AND ORGAN DISTRIBUTIONS OF GALLIUM-67 OXALATE, LIGAND BONDED TO PROTEINS IN RODENTS.

Haines JE, Hanada JM, Retondo R, Baugh R, Berger C, Yeung DY, Krishnamurthy GT, Bobba V, Shaich H
Div. Nuclear Medicine, Univ. Oregon Health Sciences Center, 3181 S.W. Sam Jackson Park Road, Portland, OR, 97201
Int J Nucl Med Biol; 8(4):237-242 1981

Gallium-67 fibrinogen, prepared without stannous tin has been shown by Biogel agarose chromatography, cellulose acetate strip electrophoresis, and coagulability studies done on pure 67Ga-fibrinogen, and on this radiopharmaceutical isolated from rat blood, 1/2 hr and 3 hr after injection, to be stable for 3 hr. This is the time when most of the tumor uptake of 67Ga occurs as shown by Sephton (1964) and Larson (1978c). In the R3259, large cell sarcoma, in Fisher rats, 67Ga fibrinogen, prepared without tin, has been shown to have significantly higher tumor/blood ratios than 67Ga citrate at 24 hr after injection. This is due partly to the higher uptake in the tumor, and partly to the fact that the blood level of 67Ga-fibrinogen drops from 80% of the dose at 1/2 hr after injection to 8% of the dose at 24 hr after injection. When prepared with stannous tin, 67Ga-fibrinogen shows significantly higher tumor/organ ratios in the

SAI, s pindle cell sarcomas in A/J mice only when the amounts of gallium-67 and fibrinogen are restricted. This effect is thought to be similar to the scandium effect of Hayes (1980) as both produce higher excretions from the animals, increased uptake in bone, and both involve loose binding of gallium-67 to protein. (Author abstract) (11 Refs)

51. THE ROLE OF TRANSFERRINS IN GALLIUM UPTAKE.

Larson SM, Grunbaum Z, Rasey JS
Nuclear Medicine Section, Medical Service (111), Veterans Admin. Medical Center, Seattle, WA, 98108
Int J Nucl Med Biol; 8(4):257-266 1981

In certain animal tumor systems, transferrin appears to play a key role in the cellular uptake of radiogallium. This process is mediated by a transferrin receptor which is present on tumor cells. In vitro studies using tumor cells growing in tissue culture demonstrate that the uptake is saturable so that the rate of 67gallium uptake is dependent on the degree to which 67Ga-transferrin competes with non-labeled transferrin for binding to tumor cell-associated transferrin receptors. Although the actual mechanism of this is not known, the evidence suggests that the 67Ga-transferrin complex is internalized into the cell, and that 67Ga is subsequently transferred to other subcellular macromolecules. Also, iron and gallium share a kinetically equivalent transport pathway. (Author abstract) (41 Refs)

52. ALTERATIONS OF GALLIUM-67 UPTAKE IN TUMORS BY CIS-PLATINUM.

Noujaim AA, Terner UK, Turner CJ, Van Nieuwenhuyze B, Lentle BC
Div. Bionucleonics and Radiopharmacy, Univ. Alberta, Edmonton, Alberta T6G 2N8, Canada
Int J Nucl Med Biol; 8(4):289-293 1981

A chemotherapeutic agent used for the treatment of a variety of cancers, cis-dichlorodiamine platinum (cis-Pt), was found to interfere with the normal clinical uptake of radiogallium. Competitive experiments in which cis-Pt and 67Ga-nitrilotriacetate were incubated with transferrin, demonstrated that no interference of gallium binding to transferrin occurs at this stage. The melanoma tissue culture studies indicated that the uptake of 67Ga-citrate and 67Ga-transferrin was affected only after prolonged preincubation of the cells with cis-Pt. This was confirmed in vivo. Tumor-bearing dogs injected with both 67Ga-transferrin and cis-Pt showed a delayed effect and a reduced uptake of radiogallium in the tumor. These findings suggest that the effect of cis-Pt on gallium uptake is related to the cellular protein synthesis rather than the inhibition of the binding of 67Ga to transferrin. (Author abstract) (6 Refs)

53. RELATIONSHIP OF IRON METABOLISM TO TUMOR CELL TOXICITY OF STABLE GALLIUM SALTS.

Rasey JS, Nelson NJ, Larson SM
Dept. Radiation Oncology, Univ. Washington, Seattle, WA
Int J Nucl Med Biol; 8(4):303-313 1981

The antitumor properties of citrated gallium nitrate (NSC 15200) have been teste d using the EMT-6/UW mouse sarcoma growing in vitro or in vivo. This tumor system has been used in both growth forms in our studies which led to the transferrin receptor hypothesis of the mechanism of uptake of tracer levels of gallium-67 citrate. Gallium nitrate is both cytostatic and lethal in vitro with some growth inhibition occurring after chronic exposure to low doses (10 ug per ml) which kill essentially no cells. Cell kill and growth inhibition were both observed if cells were exposed for longer times at higher doses. The effects of gallium nitrate were enhanced by the addition of human transferrin to the culture medium. The enhanced toxicity was consistent with, and proportional to, increased gallium uptake in the presence of transferrin. The addition of ferric citrate greatly reduced the toxic effect of the gallium salt. The enhancing effect of transferrin and protective action of ferric citrate are consistent with our studies of the effect of these two agents on concentration of tracer levels of the tumor-imaging radiopharmaceutical, carrier-free gallium-67 citrate. Tumors in vivo were largely resistant to 10 daily doses of 90 mg kg-1 of gallium nitrate. Ga may mimic Fe in some aspects of cell metabolism. Competition between the two metals occurs at the initial uptake step (binding to transferrin) and possibly to a lesser extent at other points in cellular incorporation and deposition. Iron has been implicated as a regulatory factor in cell growth and may be essential for cell proliferation. The toxicity of stable gallium is interpreted in the context of similarities of metabolism of the two metals. (Author abstract) (20 Refs)

54. RELATIONSHIPS BETWEEN THE METABOLISM OF 67GA AND IRON.

Sephton R
Cancer Inst., 481 Little Lonsdale St., Melbourne 3000, Australia
Int J Nucl Med Biol; 8(4):323-331 1981

This paper reviews the evidence regarding transferrin's participation in the mechanism by which tumor cells attain high concentrations of 67Ga. Studies using cultured tumor cells indicate that the irreversible cellular binding of 67Ga and 59Fe is preceded by the binding of the tracer-transferrin complex to specific transferrin receptors which are present in considerable numbers on these cells. Kinetics and distribution of 67Ga in vivo may then be explained in terms of its dissociation from circulating transferrin, its permeation and reversible binding in extravascular spaces, and its eventual transferrin-mediated uptake into the tumor cells. This model plausibly accounts for most of the apparent inconsistencies between previous in vitro and in vivo findings. For instance, the fact that manipulations inhibiting the binding of 67Ga in plasma give rise to an increased rather than decreased rate of tumor binding means that it is extravascular rather than circulating transferrin which mediates the uptake of 67Ga by the tumor cells. (A uthor abstract) (29 Refs)

55. STUDIES ON THE UPTAKE OF 67GA AND 59FE AND THE BINDING OF TRANSFERRIN BY CULTURED MOUSE TUMOUR CELLS.

Sephton RG, Harris AW
Cancer Inst, 481 Little Lonsdale St., Melbourne 3000, Australia
Int J Nucl Med Biol; 8(4):333-339 1981

Two cultured mouse tumor cell lines, HPC-108 (myeloma) and WEHI-22 (T lymphoma), were used in an investigation of transferrin promotion of 67Ga and 59Fe uptake by malignant cells. The effectiveness of added human transferrin could be readily demonstrated on the cells in culture medium containing fetal calf serum, but transferrin-promoted uptake varied considerably between different batches of the serum. In serum-free medium, transferrin at concentrations as low as 1 ug ml-1 promoted substantial uptake of 67Ga and maximal uptake of 59Fe. Saturation of the transferrin with iron pre-empted its activity toward both tracers, indicating their transport requires binding to the same sites on transferrin. High affinity receptors for transferrin on the tumor cells were characterized by measurement of the binding of diferric 125I-labeled human transferrin

to whole cells at 15 C. The HPC-108 line possessed 4 x 10(5) receptor per cell, WEHI-22 1.5 x 10(5) per cell, the EMT6 sarcoma line only 5 x 10(4) per cell, all with a dissociation constant of 1.4-2.3 nM. Some aspects of 67Ga and 59Fe uptake were explained by the characteristics of this receptor and the previously demonstrated difference between the two tracers in affinity for transferrin. (Author abstract) (16 Refs)

56. ALTERED BIODISTRIBUTION OF RADIOGALLIUM FOLLOWING BCG TREATMENT IN MICE.

Shysh A, Mallet-Paret S, Lentle BC, Jackson FI, McPherson TA, Johnson GR

Div. Bionucleonics and Radiopharmacy, Univ. Alberta, Edmonton, Alberta, Canada

Int J Nucl Med Biol; 8(4):349-356 1981

A mouse animal model has been used in this study which was prompted by clinical observations that 67Ga-citrate scintigraphs of patients with multi-system melanoma who had been treated with BCG revealed unusually high blood concentrations of the radiotracer, abnormal diffuse pulmonary localization and increased uptake at sites not corresponding with clinical evidence of metastases. Groups of mice were immunized by a series of intradermal injections of BCG. Tissue distribution studies were performed 48 hr after iv injection of 67Ga-citrate. These same tissues were also examined histopathologically. Increased uptake of radiogallium was seen in the liver, lungs, spleen, kidneys and blood of the BCG-treated mice when compared to normal controls. A close correlation was seen between the incidence of radiogallium concentrations and the presence of microscopically visible lesions in each of the tissue samples. Autoradiography of liver sections from BCG-treated mice injected with 67Ga-citrate indicated that the radioactivity was localized to a large extent, at sites of BCG induced granuloma. 67Ga was shown to be taken up significantly by live BCG cells in in vitro incubation but little or no incorporation occurred with heat-killed BCG. (Author abstract) (18 Refs)

57. THE EFFECTS OF DIFFERING GALLIUM-TRANSFERRIN-ANION COMPLEXES ON THE TUMOR UPTAKE OF GALLIUM-67.

Terner UK, Noujaim AA, Lentle BC, Turner CJ

Dept. Nuclear Medicine, Cross Cancer Inst., Edmonton, Alberta, Canada

Int J Nucl Med Biol; 8(4):357-362 1981

Different gallium-transferrin-anion complexes (nitrilotriacetate, maleate, malonate and oxalate) were investigated to determine the effect of such anion complexes on gallium-67 uptake by tumors. The tumor model used was the canine transmissible venereal tumor (TVT). The activity over the tumor and precordium were monitored. The uptake pattern of gallium by the tumor varied greatly between the anion complexes. Following nitrilotriacetate (NTA) as well as maleate complex administration the radiogallium level in the tumor increased to 181% in both instances over a 3 hr period after injection. The rate of tumor uptake of gallium was lower following infusion of Ga-Tf malonate or oxalate complex attaining an increase of 145% and 136% 3 hr post-injection. We conclude therefore that different anions, involved in complexing gallium to transferrin do play an important role in the uptake of the radionuclide by tumors. (Author abstract) (17 Refs)

58. THE MECHANISM OF TUMOR LOCALIZATION OF GALLIUM-67 CITRATE: ROLE OF TRANSFERRIN BINDING AND EFFECT OF TUMOR PH.

Vallabhajosula SR, Harwig JF, Wolf W

Andre Meyer Dept. Physics-Nuclear Medicine, Mount Sinai Medical Center, New York, NY

Int J Nucl Med Biol; 8(4):363-370 1981

When injected at tracer levels into the blood, radiogallium binds to plasma transferrin and its transported to the tumor tissue. The mechanism, however, by which this transferrin-bound gallium is converted to tumor-bound gallium is not clearly understood. We observed in vitro that the stability of gallium-transferrin complex could be affected by increased hydrogen ion concentration (pH effect) or by decreased transferrin concentration (dilution effect). In the in vitro tumor cell experiments with L1210 leukemia cells, the cellular uptake of gallium showed an inverse pH dependence. The presence of glucose in the incubation medium did not alter the nature of gallium uptake by the L1210 cells, whereas the uptake of gallium by Ehrlich ascites cells was significantly influenced by both pH and glucose. Tumor uptake of gallium in rats bearing Walker-256 carcinosarcoma or Murphystum lymphosarcoma was significantly enhanced by prior glucose administration. These results indicate that the stability of gallium-transferrin complex is pH-dependent and suggest that acidic pH at the tumor site may be one of the factors involved in g allium localization in tumors. Clinical differences in gallium uptake by various tumor types may, in part, reflect differences in tumor pH. (Author abstract) (26 Refs)

59. THE RELATIVE STABILITIES OF 67GA COMPLEXES OF LACTOFERRIN AND TRANSFERRIN AT VARIOUS PH'S.

Weiner RE, Schreiber GJ, Hoffer PB, Shannon T

Dept. Diagnostic Radiology, Univ. Kansas Coll. Health Sciences and Hosp., Rainbow Blvd. at 39th St., Kansas City, KS, 66103

Int J Nucl Med Biol; 8(4):371-378 1981

The ability of lactoferrin (Lf) to remove 67Ga originally bound to transferrin (Tf) and Tf to dissociate 67Ga originally bound to Lf was examined using the equilibrium dialysis technique. When Tf-67Ga was challenged by Lf for 20 hr, at pH 7.4, Lf dissociated a majority (approx 75%) of the 67Ga bound to Tf. Increasing the incubation citrate ion concentration to 150 uM did not significantly accelerate the dissociation of Tf-67Ga complex by Lf. This dissolution of the Tf-67Ga complex was a specific effect due competitive uptake of 67Ga by the Lf iron binding sites since neither human serum albumin nor iron-replete Lf caused any significant dissociation of 67Ga bound to Tf. In contrast, under similar conditions, Tf did not remove activity from preformed Lf-67Ga complex. Lowering the pH from 7.4 to 6.2 (to mimic conditions found in an abscess or tumor), had little influence on these results. The incubation pH did influence the absolute amount of the radioactivity bound to Tf and Lf. As the pH was lowered from 7.4 to 6.2, Lf-bound activity decreased slightly from 96 to 87% while the fraction of Tf-bound radionuclide decreased from 77% to 63%. Thus, Lf present in the tumor or abscess site would be able to remove and retain the 67Ga activity brought to the site by Tf whether or not acidic conditions prevailed. (Author abstract) (37 Refs)

REVIEWS

60. TECHNOLOGICAL MUTATIONS AND REDUCTION IN IRRADIATION TO THE PATIENT IN NUCLEAR MEDICINE.

Bok B, Cavailloles F, Colas-Linhart N
Service de medecine nucleaire et biophysique, Hopital Beaujon, F 92118 Clichy Cedex, France
J Radiol; 62(11):582-584 1981

Diagnostic use of nuclear medicine is discussed. Topics considered include various types of radiological detectors, physical and biological properties of radionuclides, the ideal radiopharmaceuticals, and modifications of radionuclide scanning in the evaluation of bone and thyroid disorders. Radionuclide scanning may also be used in cerebral, liver, and pancreatic examinations and for the study of tumors and abscesses. (4 Refs) (In FRE)

61. ROUTINE PREVENTION OF ABUSIVE IRRADIATION IN NUCLEAR MEDICINE.

Ducassou D
Service de Medecine Nucleaire, Hopital du Haut-Leveque, F 33604 Bordeaux-Pessac, France
J Radiol; 62(11):596-597 1981

When using radionuclide scanning the advantages and risk associated with the tec hnic must be balanced. Radiation doses delivered to the target organ during scintigraphic examination of the liver, lungs, bone, and spleen are described. Minimization of dose, protection of personnel and of workers who produce the radiopharmaceuticals are discussed. The role of the doctor in preventing abuse of radiodiagnostics is considered. (6 Refs) (In FRE)

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Nuclear Medicine

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U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES

Public Health Service • National Institutes of Health • National Cancer Institute

HE 20. 3173/2:

BREAST NEOPLASMS

1. MYOCARDIAL ACCUMULATION OF 99MTC MDP IN PATIENTS SUBJECTED TO PROLONGED TREATMENT WITH ADRIAMYCIN. THE PROTECTIVE ACTION OF STROPHANTHIN AND VITAMIN E.

Clambellotti E
Medicina Nucleare 'Rodolfo Caraccio', Ospedale degli Infermi, Biella, Italy
Minerva Med; 73/1/2):21-24 1982

Thirty-five patients (2 men, 33 women; 60.71 -16.8 yr old) with metastases (ME) due to mammary carcinoma were treated with adriamycin (40-60 mg/square meter, every mo), vincristine, and cyclophosphamide. K-Strophanthin (K-S: 0.125 mg) and vitamin E (VE: 210 mg) were administered 6 days before, during, and 6 days after the treatment with the anticancer agents. All of the patients were placed under cardiac control prior to each cycle of the treatment. Results of scintigraphy (SC) were evaluated according to Lyons. Myocardial and bone SC were performed after 550-650 MBq of 99mTc MDP was injected. The myocardial SC tests were performed in duplicate to avoid false positive results due to abnormal absorption by the thoracic wall. Tolerance of the antiblastic treatment was improved subjectively. Results of the SC indicated Grade 0 disease in 32 of the patients, Grade I in 2, Grade II in 3, and Grade III in none. Results of the SC performed on patients that did not receive the K-S and VE showed 18 patients with Grade 0 disease, 12 with Grade I, 2 with Grade II, and 3 with Grade III, as reported in an earlier study. The K-S and VE thus decreased the cardiac toxicity of the adriamycin. (27 Refs) (In ITA)

2. RADIOISOTOPE-THERMOGRAPHIC STUDIES IN PATIENTS WITH BREAST NEOPLASMS.

Lenskaia OP
All-Union Cancer Res. Center, Moscow, USSR
Med Radiol (Mosk); 26(12):35-38 1981

Diagnostic efficacy of combined thermography and scintigraphy was studied in 152 patients (23-74 yr old) with breast neoplasms. All patients underwent surgery; histological examination of tumor specimens showed cancer in 98 patients and benign breast tumors in 54. Preoperative thermography indicated breast cancer in 82/98 patients; false negative findings in 16 patients were associated with small (less than 1.5 cm) tumor size. Correct thermographic diagnosis of benign breast tumor was made in 42/54 patients; false positive findings in 12 patients were associated with active proliferative processes in the breast tissues. Increased accumulation of 99mTc was observed in 78/98 patients with breast cancer and in 8/54 patients with benign breast tumors. In contrast with 99mTc, 67Ga-citrate and 111In-bleomycin did not accumulate in benign breast tumors. (9 Refs) (In RUS)

CENTRAL NERVOUS SYSTEM NEOPLASMS

3. COMPARATIVE ASPECTS OF COMPUTERIZED AXIAL TOMOGRAPHY, ANGIOGRAPHY AND SCINTIANGIOENCEPHALOGRAPHY IN A PATIENT WITH BRAIN METASTASES. CASE REPORT.

Planchon CA, Fendler JP, Nouailhat F, Perez R
Service de Medecine Nucleaire, American Hosp. Paris, Boite Postale 109, 63, boulevard Victor-Hugo, 92202 Neuilly sur Seine Cedex, France
Ann Radiol (Paris); 24(7):585-588 1981

Computerized axial tomography, angiography, and scintiangioencephalography were used to diagnose small-cell carcinoma of lung with hepatic, adrenal gland, and three brain metastases in a 65-yr-old man who had presented with Wernicke's aphasia and right homonymous lateral hemianopia. Prior to pathological examination, a diagnosis of pulmonary tuberculoma had been considered. The complementary natu re of computerized axial tomography, scintiangioencephalography, and angiography is discussed. (5 Refs) (In FRE)

DIGESTIVE NEOPLASMS

4. COMPARATIVE EVALUATION OF CHOLECYSTOGRAPHY, CHOLANGIOGRAPHY, ECHOTOMOGRAPHY, AND CHOLESCINTIGRAPHY IN SURGICAL BILE DUCT DISORDERS.

Sgro M, Mure G, Campanoni V, Clerici R
I Divisione Chirurgia Generale, Ospedale Generale Provinciale di Gallarate, Gallarate, Italy
Minerva Med; 73(3/4):109-114 1982

Cholecystography (CCG), cholangiography (CAG), echotomography (ETG), and cholescintigraphy (CSG) were comparatively evaluated in 70 patients (27 men, 43 women; 22-76 yr old) with bile duct disease. Of the 70 patients, 30 had cholelithiasis and surgery, 20 biliary cyst, and 20 jaundice (JA). Results of of the patients with cholelithiasis or biliary cysts showed that the ETG diagnosed correctly 27/30 patients with cholelithiasis and 19/20 patients with biliary cyst. Among the patients with the JA, 6 had pancreatic cancer (PA), 4 had cancer of the hepatic biliary duct (CHBD), and 1 had hilar metastases. Patients with JA and bilirubin greater than 4 mg% should be examined with the aid of the ETG and the CSG, since the CAG cannot be used. The ETG diagnosed correctly 4/6 patients with PA and 2/4 patients with CHBD; the CSG diagnosed correctly the 2/6 patients with the PA. Protocols developed and used in diagnosis of the patients with or without JA were presented. (69 Refs) (In ITA)

5. VARIABLE INTERPRETATION OF LIVER SCINTIGRAPHY IN MALIGNANCY AS AN AID IN CLINICAL DECISION-MAKING.

Christensen M, Ingeberg S, Brochner-Mortensen J, Rodbro P
Dept. Clinical Physiology and Gastrointestinal Surgery, Inst. Pathology, Aalborg Hosp., Aalborg, Denmark
Acta Med Scand; 211(1/2):23-26 1982

Despite technical progress in liver radioisotope scintigraphy, the overall accuracy in detecting metastases has not improved. It has been suggested that a fixed scintigram interpretation in reply to changing clinical problems is partly responsible. An

evaluation of the possibilities of improving the clinical value of the test by using six cutoff levels in the scintigraphic interpretation is presented. The test population is a prospectively planned consecutive series of 185 patients strongly suspected of having gastric or colo-rectal malignancies. The incidence of liver metastases was 15%. The relationship between the predictive value of a positive test and the false negative ratio at different incidences of metastases is demonstrated graphically. To improve the clinical value of liver scintigraphy, a close cooperation between clinicians and physicians in nuclear medicine to define the clinical problem and the appropriate scintigraphic cutoff level is necessary. (Author abstract) (13 Refs)

6. 133XE UPTAKE IN FOCAL HEPATIC FAT ACCUMULATION: CT CORRELATION.

Patel S, Sandler CM, Rauschkolb EN, McConnell BJ
(c/o Sandler) Dept. Diagnostic Radiology, Univ. Texas Medical Sch. Houston, 6431 Fannin St., Houston, TX, 77030
AJR; 138(3):541-544 1982

Irregular fatty infiltration of the liver appears as focal areas of decreased attenuation on computed tomography (CT) and often cannot be distinguished from other, clinically more significant space-occupying lesions. Six patients with CT and clinical findings suggestive of fatty infiltration had xenon-133 ventilation scans of the liver. Four of these patients showed uptake and retention of 133Xe in the corresponding area of the liver, confirming the presence of fatty infiltration. The two patients in whom there was no uptake or retention of xenon by the liver were subsequently proven to have liver abscess and metastatic adenocarcinoma, respectively. (Author abstract) (7 Refs)

7. INTRAARTERIAL YTTRIUM 90 IN THE TREATMENT OF HEPATIC MALIGNANCY.

Mantravadi RV, Spigos DG, Tan WS, Felix EL
Univ. Illinois Hosp., P.O. Box 6998, Chicago, IL, 60680
Radiology; 142(3):783-786 1982

Fifteen patients with malignant tumors involving the liver were treated with hepatic intraarterial injection of yttrium 90 microspheres. With the exception of one patient, no acute or long-term side effects were noted. Four patients are alive and functionally active with follow-up periods of 6, 6, 9 and 12 mo. Vascularity of the metastases, absence of extrahepatic disease, and performance status prior to treatment were determining factors for a successful result. (Author abstract) (9 Refs)

8. NUCLEAR MAGNETIC RESONANCE IMAGING OF THE PANCREAS.

Smith FW, Reid A, Hutchison JM, Mallard JR
Div. Nuclear Medicine, Univ. Aberdeen, Foresterhill, Aberdeen AB9 2ZB, Scotland
Radiology; 142(3):677-680 1982

Nuclear magnetic resonance (NMR) images were obtained from 12 patients with pancreatic disease, and from 40 patients in a control group. Correlation of the images with ultrasound examinations and with laparotomy in five cases indicates that NMR is accurate in the demonstration of pancreatic pathology. Though the images bear close similarity to those obtained by conventional computed tomography (CT), further investigations are needed to delineate the true accuracy of NMR. (Author abstract) (13 Refs)

9. ANGIORADIOLOGICAL DIAGNOSIS OF PANCREATIC DISEASE.

Vasil'chenko SA, Krivenko EV, Minkh NV, Ogneva TV
Res. Roentgenoradiological Inst., Moscow, USSR
Med Radiol (Mosk); 27(1):31-35 1982

Diagnostic efficacy of combined scintigraphic and angiographic examinations was evaluated in 280 patients (23-68 yr old) with pancreatic neoplasms (78), chronic pancreatitis (83), and diseases of the duodenum, gallbladder, or stomach (119). All patients underwent scintigraphy with 99mTc-co lloid and 75Se-methionine; 73 patients were also subjected to angiographic examination. Diagnosis was verified in 219/280 patients. Scintigraphy showed normal pancreas in 107 patients, chronic pancreatitis in 80, and pancreatic neoplasms in 31. Characteristic scintigraphic signs of pancreatic neoplasms included the absence of the image of part of the pancreas and enhanced accumulation of 75Se-methionine in the functional part of the organ. Angiographic symptoms of pancreatic tumor included amputation of the vessels, infiltration or stenosis, and the presence of the pathological vessels. (11 Refs) (In RUS)

10. AN EVALUATION OF THE MEDIASTINAL LYMPHOSCINTIGRAM FOR CARCINOMA OF THE ESOPHAGUS STUDIED WITH 99MTC RHENIUM SULFUR COLLOID.

Terui S, Kato H, Hirashima T, Iizuka T, Oyamada H
Div. Nuclear Medicine, Natl. Cancer Center Hosp., Tsukiji 5-chome, Chuo-ku, Tokyo 104, Japan
Eur J Nucl Med; 7(3):99-101 1982

Lymphoscintigraphy (LS) was performed on nine men (53-71 yr old, mean age 63.3 yr) with esophageal carcinoma. Tumors included seven squamous cell carcinomas, one adenosquamous carcinoma, and one adenocarcinoma. Five patients received preoperative radiotherapy (2,850-3,800 rad, av 3,148 rad). LS was performed 1-2 days prior to surgery by injection of 3 mCi 99mTc rhenium sulfur colloid into the submucosal layer of the esophagus. Injections were made on the oral, and when possible, the anal side of the tumor. Sequential pictures were made at 60-sec intervals up to 30 min after injection then at 1, 3, and 20 hr after injection. Dissected lymph nodes were studied by scintiphotography and histologic examination. Best results were obtained by LS at 20 hr, although 'hot' nodes were visualized 5 min after injection. A total of 106 nodes were removed from the mediastina of nine patients. Metastases were found in 12/106 nodes. LS visualized 26 nodes but did not visualize 80 nodes. Metastases were found in 34.6% of visualized and 3.8% of nonvisualized nodes. Results indicate that LS improves the preoperative diagnosis of mediastinal lymph nodes, with 'hot' nodes indicating an increased probability of metastases. (9 Refs)

11. GA-67 SCAN IN PATIENTS WITH INTRATHORACIC ESOPHAGEAL CARCINOMA PLANNED FOR SURGERY.

Kondo M, Ando N, Kosuda S, Lian SL, Kubo A, Masaki H, Hashimoto S, Tsutsui T, Kakegawa T
Dept. Radiology, Keio Univ. Sch. Medicine, 35 Shinanomachi, Shinjukuku, Tokyo 160, Japan
Cancer; 49(5):1031-1034 1982

The authors evaluated Ga-67 scan in 68 patients with intrathoracic esophageal carcinoma initially planned for surgery. Of these, 59 patients were staged pathologically or surgically; their Ga-67 scan results were then compared with the results of pathologic or surgical investigations. Positive Ga-67 scan results correctly predicted the presence of extraesophageal

spread and lymph node metastases. Of 3 8 clinical Stage II patients, 15 (39%) could be Stage III by the results of Ga-67 scan. However, two of four clinical Stage I patients (50%) and 35 of 38 clinical Stage II patients (92%) were eventually pathologic or surgical Stage III. This high conversion rate and the high incidence of Stage III in esophageal carcinoma patients may not justify routine use of Ga-67 scan only for staging. Ga-67 scan, however, was useful for planning radiotherapy, because missing extraesophageal extension or gross metastases from the radiation fields were detected in six patients of 51 so treated. Ga-67 scan has its value in some patients with intrathoracic esophageal carcinoma. (Author abstract) (7 Refs)

ENDOCRINE NEOPLASMS

12. CRITICAL EVALUATION OF SERUM THYROGLOBULIN LEVELS AND I-131 SCANS IN POST-THERAPY PATIENTS WITH DIFFERENTIATED THYROID CARCINOMA: CONCISE COMMUNICATION.

Echenique RL, Kasi L, Haynie TP, Glenn HJ, Samaan NA, Hill CS
P.O. Box 36734, Houston, TX, 77036
J Nucl Med; 23(3):235-240 1982

Serum thyroglobulin measurements by radioimmunoassay were performed in the follow-up of 68 patients with differentiated thyroid carcinoma undergoing I-131 total-body scans following surgery and/or I-131 therapy. Of 12 patients with distant metastases demonstrated by I-131 scan, thyroglobulin levels were elevated (greater than 60 ng/ml) in 9 (75%); the remaining 25% either ranged between 20 and 60 ng/ml or were below 20 ng/ml in spite of having functional metastases. Of six patients with only regional lymph-node metastases demonstrated by I-131 scan, only one (16%) had an elevated thyroglobulin level, while two fell in the 20-60 ng/ml range and three were below 20 ng/ml. Of the remaining patients with no metastatic disease demonstrable by I-131 scan, three (6%) had elevated thyroglobulin levels. These patients were subsequently found to have metastatic disease by other criteria. These results suggest caution in the use of thyroglobulin levels as a replacement for I-131 scans in the follow-up of differentiated thyroid carcinoma. Based on our study, however, the two methods complement each other to achieve maximum sensitivity and reliability. (Author abstract) (12 Refs)

13. COMPARISON OF TI-201 CHLORIDE AND GA-67 CITRATE SCINTIGRAPHY IN THE DIAGNOSIS OF THYROID TUMOR: CONCISE COMMUNICATION.

Senga O, Miyakawa M, Shirota H, Makiuchi M, Yano K, Miyazawa M, Takizawa M
Dept. Surgery, Faculty Medicine, Shinshu Univ., 3-1-1, Asahi, Matsumoto, Nagano 390, Japan
J Nucl Med; 23(3):225-228 1982

Twenty-five patients with thyroid tumors were scintigraphed with both TI-201 chloride and Ga-67 citrate. All cases showed a focal area of decreased activity with I-131 or pertechnetate (Tc-99m), and each had a histological diagnosis after surgery or excisional biopsy. From the data we conc lude the following: (1) Tumors giving a positive scan with TI-201 chloride but negative results using Ga-67 citrate prove to be differentiated carcinoma or poorly differentiated adenoma. (2) All tumors that are positive with Ga-67 are highly malignant types, and if these tumors are negative by TI-201, undifferentiated carcinoma is suggested. (3) Ga-67 citrate scintigraphy is a useful procedure in locating distant metastases, in determining the area to be irradiated, and in judging the effect of therapy on undifferentiated carcinoma. (Author abstract) (13 Refs)

14. COLD NODULES OF THE THYROID: CORRELATION BETWEEN CYTOLOGY PERFORMED ON FINE-NEEDLE ASPIRATION BIOPSY AND HISTOPATHOLOGY.

Borges R, De Paula EC
Rua T - 62 - Q. 162, Lote 06, Setor Bueno, CEP 74000, Goiania, Goias, Brazil
Arq Bras Endocrinol Metabol; 25(4):133-136 1981

Cytologic examinations (CE) were performed on fine-needle aspiration biopsies (AB) of cold nodules of thyroids of 100 patients (10 men and 90 women; 21-70 yr old) who underwent thyroid surgery. The cold nodules were single in 57 patients and multiple in 43; they were solid in 81 patients and cystic in 19. According to the histopathologic diagnosis, 83 of the patients had colloid goiter, 8 had thyroid carcinoma (TC), 6 had adenoma, and 3 had thyroglossal cysts. Of the eight patients with the TC, two were less than 21 yr old, two were 21-30, two were 31-40, and two were 51-60 yr old. Five of the TC were located in single nodule thyroids and three were located in multiple nodule thyroids. All eight of the TC were in solid nodules, none in cystic. The CE of the AB gave positive results in six of the eight TC patients and false negative results in two. Four false positive results were obtained by the CE of the AB in four patients less than 30 yr old. Scintigraphy with 131I indicated single nodules with less absorption of the 131I in five TC patients and multiple nodules in three TC patients. The CE of the AB was considered to be a valid test that circumvents use of other, more expensive tests and unnecessary surgery with its possible complications. (22 Refs) (In POR)

15. SOLITARY THYROID NODULE.

van Vroonhoven TJ, Dolman A
St. Elisabeth Ziekenhuis, Tilburg, The Netherlands
Ned Tijdschr Geneeskd; 125(21):817-819 1981

The diagnostic procedure in the case of solitary thyroid nodule found on physical examination is outlined. Thyroid scintigraphy is performed to determine the thyroid function. Echography is justified, if cold nodule is found by scintigraphy. If solid tumor is demonstrated echographically, histological diagnosis is performed on specimens obtained by biopsy or preferably in the course of surgical exploration. Hemistrumectomy can be carried out in the same section, if the frozen section examination of the resected nodule shows malignancy. Malignant process is unlikely in the case of multiple nodules and in the case of solitary nodules with scintigraphically demonstrated normal thyroid function and echographically demonstrated thyroid cyst. (no Refs) (In DUT)

16. EVALUATION OF THYROID SCINTIGRAPHIC LESIONS BY WHOLE-ORGAN SECTIONS AND AUTORADIOGRAPHY.

Risberg B, Enestrom S, Lennquist S, Bergman C
Dept. Pathology I, Univ. Hosp., S-581 85 Linkoping, Sweden
Acta Pathol Microbiol Scand [A]; 90(1):19-26 1982

A new technique for detailed morphological evaluation of scintigrams of thyroid lesions based on rapid, whole-organ sectioning technique combined with autoradiography is described. The findings in 10 thyroid specimens illustrate the possibilities for assessment of thyroid scintigrams, especially of hot nodules, by this technique. (Author abstract) (15 Refs)

17. DIAGNOSTIC LOCATION OF COLD AND WARM NODULES WITH THE AID OF NUCLEAR MEDICINE.

Heinze HG
Klinik fur Strahlentherapie und Nuklearmedizin, Stadtisches Klinikums, Moltkestrasse 14, 7500 Karlsruhe, W. Germany
Therapiewoche; 32(1):35-40,43-45 1982

Diagnostic location of cold and warm nodules of the thyroid using nuclear medicine is reviewed. Topics include failure of scintigraphy (SC), use of radiodiagnosis (131I, 99mTc, and 123I), equipment, indications for SC of the thyroid, problems with cold nodules, and diagnosis of warm and hot nodules. (21 Refs) (In GER)

18. CLINICAL VALUE OF ISOTOPE METHODS IN ADRENAL MORPHOLOGY INVESTIGATIONS.

Jakubowski W, Feltynowski T, Graban W
Zaklad Medycyny Nuklearnej, Centralny Szpital Kliniczny AM, ul. Banacha la, 02-097 Warsaw, Poland
Pol Przegl Radiol; 45(5):281-287 1981

Adrenal scintigraphy was performed in 105 patients, including 50 with primary hyperaldosteronism, 27 with Cushing's syndrome, 4 with adrenal virilizing tumors, 8 with status after adrenalectomy, 6 with adrenal pheochromocytomas, and 10 with normal adrenal function. The scintigraphic findings were in agreement with the intraoperative ones in 77% of the patients with Cushing's syndrome, 91% of those with primary hyperaldosteronism, and 100% of those with virilizing tumors. It was possible to visualize the vascular bed of pheochromocytoma in 5/6 patients. Close correlation was found between the scintigraphic and computer tomographic findings in the patients with pheochromocytomas. Adrenal scintigraphy was found to be a highly valuable diagnostic method in patients with adrenocortical diseases. (15 Refs) (In POL)

19. RADIOIMMUNOLOGICAL HORMONE DETERMINATIONS AND ADRENAL CORTEX SCINTIGRAPHY IN THE DIFFERENTIAL DIAGNOSIS OF ADRENOCORTICAL TUMORS.

Slavnov VN, Valujeva GV, Jakovlev AA, Lucickij EV, Jugrinov OG
Kiewer Forschngsinstitut fur Endokrinologie und Stoffwechsel, Ministerium fur Gesundheitswesen der UkrSSR, ul. Vysgorodskaja, 69, 252114, Kiew, USSR
Radiol Diagn (Berl); 22(6):806-814 1981

Scintigraphic and hormonal indicators of adrenocortical tumors and diseases of the hypothalamic-hypophyseal-suprarenal (HHS) system were studied in 68 patients (17-57 yr old). Diagnosis was based on clinical, radiological, and laboratory findings. Basal ACTH, cortisol, aldosterone, and renin activities were measured in venous blood of peripheral, renal, and adrenal veins and the inferior vena cava. Daily fluctuations in hormonal levels and fluctuations caused by stress induced by insulin-hypoglycemia or ACTH administration were measured. Differences in measured values allowed differentiation of Itsenko-Cushing's syndrome, Cushing's disease, Conn's syndrome, hypertension, malignant hypertonia, and secondary aldosteronism. Differences reflected differing organic basis for these diseases. Adrenocortical tumors were characterized in scintigraphy by enlargement of the involved adrenal gland with intense accumulation of 131I-19-iodocholesterol. Results indicate that nuclear medical methods are suitable for differential diagnosis of hormonally active tumors and diseases of the HHS system and for monitoring the course of treatment. (9 Refs) (In GER)

GENITOURINARY NEOPLASMS

20. SCINTILLATION CAMERA RENOGRAPHY WITH 99MTC-DTPA AND 131I-HIPPURAN.

Bratt CG, Larsson I, White T
(c/o White) Dept. Clinical Physiology, Lasarettet, S-221 85 Lund, Sweden
Scand J Clin Lab Invest; 41(2):189-197 1981

A total of 64 kidneys in 37 patients (24 males, 13 females; 18-59 yr old) were examined in a comparative evaluation of 99mTc-diethylene-triamino-penta-acetate (DTPA) and 131I-Hippuran in a computer-assisted study using scintillation camera renography. Both materials were suitable indicators. 99mTc-DTPA yielded a better image, but high background activity could be a disadvantage in quantitative analysis of organ activity. Renographic curves of 99mTc-DTPA imagery were slightly flatter, but estimates of separate kidney function were not significantly different. (21 Refs)

21. RENAL IMAGING AFTER PARTIAL RENAL IRRADIATION.

Desai A
Div. Nuclear Medicine, Dept. Radiation Therapy and Nuclear Medicine, Thomas Jefferson Univ. Hosp., 11th and Walnut St., Philadelphia, PA, 19107
Clin Nucl Med; 7(3):113-116 1982

A case is reported of increased Tc-99m-MDP concentration occurring in the kidney of an adult male patient after 4,500 rads of external radiation treatment. Other scintigraphic and radiographic findings are presented. Possible mechanisms underlying the abnormal Tc-99m-MDP uptake are discussed, the most likely histopathological changes after radiation are suggested, and the pertinent literature is reviewed. (Author abstract) (17 Refs)

GYNECOLOGIC NEOPLASMS

22. THE EFFICACY OF RADIONUCLIDE LIVER AND BONE SCANS IN THE EVALUATION OF GYNECOLOG IC CANCERS.

Harbert JC, Rocha L, Smith FP, Delgado G
Div. Nuclear Medicine, Georgetown Univ. Hosp., 3800 Reservoir Rd., N.W., Washiagton, D.C., 20007
Cancer; 49(5):1040-1042 1982

Between 1978 and 1980, 33 patients with cervical cancer, 40 patiens with ovarian cancer, and 28 patients with uterine cancer underwent clinical diagnostic staging. Fifty-four patients had bone scans, and 101 patients received liver scans as a part of their staging work-up. No positive bone scan results were found. Eight of 33 patients with Stage IV disease had positive liver scan results consistent with hepatic metastases. Only 1 of 69 patients with Stage I-III disease had a positive test for metastases. While these numbers are small, the authors conclude that bone and liver scanning in asymptomatic patients with early stage gynecologic cancers may not be warranted as staging procedures. (Author abstract) (14 Refs)

HEAD AND NECK NEOPLASMS

23. CLINICAL, RADIOLOGICAL, AND NUCLEAR MEDICINAL METHODS FOR THE DIAGNOSIS OF LARYNGEAL TUMORS.

Semjukov MV, Knikov VA, Matvejenko EG, Drozdovskaja MI, Prichodjko AG

Forschungsinstitut fur Medizinische Radiologie, AdmW der UdSSR, ul. Korolova 4, 249020, Obninsk, USSR

Radiol Diagn (Berl); 22(6):799-805 1981

Diagnosis of laryngeal carcinoma (LC) and differential diagnosis from benign processes in 200 patients (195 men and 5 women, 30-78 yr old) were made using a combination of clinical, radiological, and radioisotopic studies. LC was diagnosed in 186 cases (7 Stage I, 31 Stage II, 118 Stage III, and 30 Stage IV) and chronic inflammation in 14 cases. Of 186 LC, 137 were keratinizing and 35 nonkeratinizing; no indication of malignancy was found in 22 cases. Scintigraphic scans were made of 100 patients with malignant or benign disease. 75Se-selenium methionine (75SM) was used in 80 cases and 67Ga-citrate in 20 cases. Artificial contrast x-rays of the larynx were made in 100 other patients with LC. Scintigraphic results agreed with clinical and morphological results in 66/80 cases in which 75SM was used. Scintigraphy was of particular value in cases in which clinical signs suggested LC not confirmed by histological examination. Contrast laryngography was useful as a supplementary method for determination of type and extent of LC. Results indicate that radiological and isotopic methods can correctly diagnose the type and extent of laryngeal tumors in 95-98% of cases, that contrast laryngography is effective in localization of tumors in inaccessible locations, and that choice of supplementary diagnostic methods depends on characteristics of individual cases. (11 Refs) (In GER)

24. BONE SCINTIGRAPHY WITH 99MTC-PYROPHOSPHATE IN DIAGNOSIS OF THE DEGREE OF DISSEMINATION OF HEAD AND NECK NEOPLASMS.

Prikhod'ko AG

Res. Inst. Medical Radiology, Obninsk, USSR

Med Radiol (Mosk); 27(1):58-67 1982

Diagnostic efficacy of osseoscintigraphy with 99mTc-pyrophosphate was evaluated in 105 patients with various head and neck neoplasms. Among these patients, 70 were examined to determine the degree of infiltration of the adjacent bone tissue (Group 1), 15 were examined to detect the skeletal metastases from head and neck tumors or metastases to the skull or cervical vertebrae from lung, breast, or prostatic cancers (Group 2), and 20 patients were examined to exclude the diagnosis of malignant head and neck tumor. Increased accumulation of the radionuclide was observed in 41/70 patients in Group 1. The level of accumulation depended upon the histology of the primary tumor (125-262% in the patients with carcinomas, 155-952% in the patients with sarcomas, and 152-199% in the patients with cylindromas) and its localization. X-ray confirmation of scintigraphic findings was made in 32/41 patients. X-ray examination showed no pathologic changes in all 29 patients with negative scintigraphic findings. Scintigraphy showed metastases in 12/15 patients in Group 2. Radionuclide examination confirmed the diagnosis of benign head and neck lesion in 17/20 patients in Group 3. (8 Refs) (In RUS)

25. NUCLEAR MEDICINE IN DIAGNOSIS AND TREATMENT OF DISEASES OF THE HEAD AND NECK: II.

Blahd WH, Rose JG

Veterans Admin. Wadsworth Medical Center, Los Angeles, CA, 90073

Head Neck Surg; 4(3):213-222 1982

Bone imaging with radionuclides containing 99mTc and management of thyroid conditions with compounds containing 131I are discussed. Bone imaging can be used for differentiation of allergic sinusitis from purulent sinusitis, early detection of fractures of the head and neck, evaluation of diseases of the temporomandibular joint, and detection of local extension of carcinomas of the head and neck. 131I is useful for evaluation and therapy of thyroid cancer. (48 Refs)

26. INTRATHECAL RADIOGOLD APPLICATION FOR MENINGOSIS 'PROPHYLAXIS' IN CHILDREN WITH LEUKEMIA AND NON-HODGKIN'S LYMPHOMAS.

Dorffel W, Brunhober J, Grulich M, Reuter G

II. Kinderklinik des Stadt. Klinikums Berlin-Buch, Wiltbergstr. 50, DDR-1115 Berlin-Buch, E. Germany

Radiobiol Radiother (Berl); 22(5):659-669 1981

Experience with application of 198Au-radiocolloid gold (RG) for meningosis 'prophylaxis' (MP) in children with leukemia and non-Hodgkin's lymphoma (NHL) is reported. Between 1976 and 1980, 122 children were treated with RG; 108 for MP and 14 for diagnosed meningosis. Four treatments had to be repeated because of insufficient RG distribution, 75 children had new diseases of acute lymphoblastic leukemia (ALL), 5 had NHL, and 6 children had acute myeloid leukemia (AML). Intrathecal RG application with diagnosis and indications, insufficient RG distribution in the cerebral subarachnoid space in children with ALL, MP results in children with leukemias and NHL, and MP results in children with ALL 2-5 yr after treatment start are presented. Among children with NHL, one simultaneous CNS and retrobulbar recurrence occurred. In 3 children with AML, ALL occurred after 5 yr remission, and in 15 with ALL following a hematological recurrence, no CNS recurrences were observed. Twenty-five children (48%) with ALL after RG application are still in complete remission. The results are similar to those obtained with telecobalt irradiation of the scull in combination with intrathecal methotrexate injections but without their side-effects. (In GER)

27. INTRATHECAL RADIOGOLD APPLICATION FOR MENINGOSIS 'PROPHYLAXIS' IN CHILDREN WITH LEUKEMIA AND NON-HODGKIN'S LYMPHOMAS. II. RESULTS AND PROBLEMS FROM THE NUCLEAR MEDICAL POINT OF VIEW.

Brunhober J, Tautz M, Deckart H, Dorffel W

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Radiobiol Radiother (Berl); 22(5):670-678 1981

Between 1976 and 1980, 122 children with acute leukemia (AL) and non-Hodgkin's lymphoma (NHL) received intrathecal 198Au-colloid gold (CG) injection and the effects were studied; 108 children were treated for meningosis prophylaxis (MP) and 14 for already diagnosed meningosis. Fifty-seven children were evaluated semiquantitatively (29 girls, 28 boys, 1-14 yr old) for distribution besides the scintigraphic control. Dosese were applied according to the age of patients: 1.5 mCi to 3 patients (1-2 yr old), 2.0 mCi to 1 patient (2 yr old), 2.5 mCi to 1 patient (3 yr old), 3.0 mCi to 41 patients (3-12 yr

old), 3.5 mCi to 8 patients (10-13 yr old), and 4.0 mCi to 3 patients (13-14 yr old). Normal CG distribution in cerebral and spinal liquor and liver, and CG distribution in cerebral liquor in children with AL and NHL are presented. Fifteen of 57 children did not receive a sufficient dose to the subarachnoid space. Dosimetric problems arise in the irregularities of distribution in the arachnoid space, and computed tomography should be applied for diagnosis. Results of MP with CG can be compared with those obtained for telecobalt therapy with respect to the recurrences. Comparison of both methods is limited because they are based on a different radiobiological effect. (55 Refs) (In GER)

MUSCULOSKELETAL NEOPLASMS

28. WHOLE BODY BONE SCINTIGRAM WITH 99MTC-HMDP (TECHNETIUM-99M-HYDROXY METHYLENE DIPHOSPHONATE).

Isobe Y, Ko S, Umegaki Y, Takahashi S, Kawaguchi N, Wada S, Matsumoto S
Dept. Nuclear Medicine, Cancer Inst. Hosp., 1-37-1 Kamiikebukuro, Toshima-ku, Tokyo 170, Japan
Radioisotopes; 30(11):606-608 1981

Whole body scans using 99mTc-HMDP (20 mCi) were performed preoperatively, postoperatively, or during observation periods in 55 patients with primary cancers. Primary cancer sites in cluded breast (31), uterinc cervix (5), lung (3), stomach (3), and esophagus (2). Efficacy of the 99mTc-HMDP imaging was evaluated with a radioisotopic diagnostic (RID) code (Code 1-5) and an x-ray code (Code 1-5). Correlation of the two codes was good in most cases, but in cases where the x-ray code did not definitively indicate malignancy or metastasis even within Code 1 or 2, those same cases were classified as RID Code 3 or 4. No complications were observed in any of the patients. The 99mTc-HMDP was considered to be comparable to other imaging agents (eg 99mTc-methylene diphosphonate) and superior to x-rays for simple detection of bone metastasis. (3 Refs) (In JPN)

29. OSTEOSCINTIGRAPHY IN DIAGNOSIS OF SKULL BONE DEFECTS OF DIFFERENT ETIOLOGY.

Rostovtseva TF, Smirnov IuN
Res. Roentgenoradiological Inst., Moscow, USSR
Med Radiol (Mosk); 27(1):15-20 1982

Diagnostic efficacy of scintigraphy with 99mTc-pyrophosphate was studied in 100 patients (10-60 yr old) with defects of the skull bones of different etiology. Of 100 patients, 76 showed increased accumulation of the radionuclide in the pathologic foci, 20 had normal accumulation, and 4 had decreased accumulation of the radionuclide. The four patients with decreased accumulation of the radionuclide had bone cysts. Of 20 patients with normal distribution of the radionuclide, 4 had anatomical abnormalities, 3 had bone cysts, 3 had benign bone tumors, and 7 had malignant tumors. Of 76 patients with increased accumulation of the radionuclide, 34 had cysts, osteodystrophy, eosinophilic granuloma, or fibrous osteodysplasty, 1 had osteoid osteoma, 22 had hemangiomas, and 19 had malignant neoplasms (2 had sarcomas, 1 had myeloma, 1 had Hodgkin's disease, and 15 had bone metastases). False negative findings in 7 patients with malignant tumors were associated with small size of bone lesions. (19 Refs) (In RUS)

30. THE SIGNIFICANCE OF CIRCUMSCRIBED ACTIVITY CONCENTRATIONS OF THE FRONTO-BASAL REGION OF THE SKULL IN SKELETAL SCINTIGRAPHY.

Crone-Munzebrock W, Heller M, Witte G
Abteilung Nuklearmedizin, Radiologische Universitatsklinik, Martinistr. 52, D-2000 Hamburg 20, W. Germany
Radiol Diagn (Berl); 22(6):815-818 1981

Retrospective study of examinations of 324 patients by scintigraphy using 99m-technetium (99mTc) showed circumscribed concentration of 99mTc activity in the fronto-basal region of the skull in 32 patients. The concentrations were evident in lateral views. Although such concentrations may indicate possible brain tumors or metastases, radiological examination showed that no malignancy was involved in the cases studied. (11 Refs) (In GER)

31. SPINAL CHONDROSARCOMA DEMONSTRATED BY TC-99M-MDP BONE SCAN.

Smith FW, Nandi SC, Mills K
Dept. Nuclear Medicine, Aberdeen Royal Infirmary, Foresterhill, Aberdeen, AB9 2Z B, Scotland
Clin Nucl Med; 7(3):111-112 1982

A case of chondrosarcoma of the spine in a 45-yr-old woman is described. The bone scan performed after the intravenous injection of Tc-99m-MDP not only confirmed the solitary nature of the tumor, but also demonstrated its extent within the spinous process of the second dorsal vertebra. Preoperative bone scan in the management of chondrosarcoma is advocated as a safe, noninvasive technique for assessing the extent of the tumor. (Author abstract) (4 Refs)

32. THE VALUE OF SKELETAL SCINTIGRAPHY IN THE DIAGNOSIS OF PRIMARY MALIGNANT BONE TUMORS.

Schumichen C
Abteilung Klinische Nuklearmedizin, Hugstetter Strasse 55, 7800 Freiburg/Brsg., W. Germany
Therapiewoche; 32(4):335,336,339,340,342 1982

The uses of skeletal scintigraphy in diagnosis of primary malignant bone tumors is discussed with respect to the value of this method in establishing the nature and extent of a primary tumor and in detecting skeletal or soft-tissue metastases. The diagnostic accuracy of scintigraphy is high (80%-95%), but some tumors, such as fibrosarcoma and plasmocytoma, produce frequent false-negative findings. The complimentary relationship between scintigraphy and x-rays in the accurate diagnosis of malignancies of the bone is emphasized. (30 Refs) (In GER)

RESPIRATORY AND CARDIOVASCULAR NEOPLASMS

33. TC-99M GLUCOHEPTONATE IN DETECTION OF LUNG TUMORS.

Vorne M, Sakki S, Jarvi K, Vahatalo S
Dept. Nuclear Medicine, Paijat-Hame Central Hosp., 15850, Lahti 85, Finland
J Nucl Med; 23(3):250-254 1982

Sixty-three patients aged 21-80 yr were examined. Tc-99m glucoheptonate (Tc-GH) scintigraphy was performed in 32 pa-

tients: 26 with primary lung carcinoma; 6 with metastases in lung, mediastinum, and pleura from carcinomas elsewhere; 8 with benign pulmonary diseases; and 23 without known pulmonary disease. Tc-GH accumulated in 23 of 26 primary pulmonary carcinomas as active foci. The specificity of Tc-GH scans for neoplasm detection was higher than that of chest radiographs. The visualization of malignant tumors was much better in the late Tc-GH images (5-6 hr) than in the early (1 hr). Metastases from other carcinomas were positive in four of six patients, but they were considerably better detected in the radiographs, except in one patient with metastatic hepatocellular carcinoma. Neoplasms or their metastases in the hilar and mediastinal regions were better detected in the Tc-GH scans than in the chest radiographs. Only one of eight benign lung processes was visualized (as a weak diffuse accumulation of Tc-GH in hilar scar formation), and 23 patients without pulmonary disease had no pathological foci. (Author abstract) (8 Refs)

34. SCINTIGRAPHIC DIFFERENTIAL DIAGNOSIS OF PULMONARY CAVITIES WITH TUMORITROPIC RADIOPHARMACEUTICALS.

Fadejev NP, Barcuk AS, Keller JM
Wissenschaftliches Forschungsinstitut fur Onkologie 'N. N. Petrov', Ministerium fur Gesundheitswesen der UdSSR, Pesocnyi-2, Leningragskaja 68, 188646. Leningrad, USSR
Radiol Diagn (Berl); 22(6):781-789 1981

Differential diagnoses of 38 patients (29 men and 9 women, 28-70 yr old) with cavity-forming diseases of the lung were made by scintigraphy (SG) using tumoritropic radiopharmaceuticals (TRP). SG was performed 2-3 days after injection of 67Ga-citrate (35-40 uCi/kg), 197Hg-chloride (4-5 uCi/kg), or 75Se-sodium selenide (4-5 uCi/kg). Results were compared with clinical findings, which showed 26 patients with carcinoma of the lung (CL: 4 centrally located and 22 peripherally located) and 12 with nontumorous diseases (4 with chronic suppurative pneumonia (CSP), 3 with chronic abscesses (CA), 3 with cysts, and 2 with fibrous cavernous tuberculosis (CT)). Of 26 patients with CL, 17 had squamous cell carcinoma, 5 had adenocarcinoma, and 4 had undifferentiated carcinoma. SG results from CL patients included 22 true positive, 1 suspect, and 3 false negative findings. Findings for 3/3 CSP and 3/3 CA patients were false positives. Results from one CT patient were suspect. All other results were true negative findings for CL. Accumulations of TRP were found in cavitary CL, cysts, abscesses, and tuberculous cavities. CL was characterized by accumulations of TRP in the wall of cancerous cavities and lack of accumulation in necrotic tissue, producing a ring- or signet-ring appearance. Results indicate that the SG with TRP is an accurate method of differential diagnosis of pulmonary cavities. (12 Refs) (In GER)

35. DETECTION OF LUNG CANCER WITH 55CO-BLEOMYCIN USING A POSITRON CAMERA. A COMPARISON WITH 57CO-BLEOMYCIN AND 57CO-BLEOMYCIN SINGLE PHOTON SCINTIGRAPHY.

Nieweg OE, Beekhuis H, Paans AM, Piers DA, Vaalburg W, Welleweerd J, Wiegman T, Woldring MG
Dept. Nuclear Medicine, Univ. Hosp., Ostersingel 59, 9713 EZ Groningen, The Netherlands
Eur J Nucl Med; 7(3):104-107 1982

Scintigraphy (SG) using 55Co-bleomycin (55CoB) was performed on 21 patients with lung lesions suggestive of lung cancer as detected by x-ray. Evaluable results were obtained with 12 male patients (50-76 yr old, mean age 65 yr). SG was performed 24 hr after iv injection of 1 mCi 55CoB; imaging was performed with a positron camera. Single-photon 55CoB-SG (SPSG) was performed immediately before or after positron imaging in five patients. SG was performed using 57Co-bleomycin (57CoB) before or at least 4 days after 55CoB-SG. 55CoB-SG detected 10/11 lung cancers; one small adenocarcinoma was not detected. SG in one case of pneumonia was correctly negative. 57CoB-SG correctly detected 11/11 cancers. SPSG produced correct positive findings in 2/5 cases, false negative findings in 1/5 cases, and equivocal findings in 2/5 cases . 55CoB-SG produced tumor-to-lung ratios (TLR) lower than those produced by 57CoB-SG. SPSG produced TLR similar to those produced by 55CoB-SG, but the standard deviations were greater. Use of 55CoB, with a half-life of 18 hr, avoided problems caused by the long half-life of 57Co (270 days). Disadvantages include small effective field size requiring more views, relatively slow processing, and increased radiation exposure to the patient. 55CoB-SG shows promise, but results are inferior to those obtained with 57Co. (19 Refs)

36. CURRENT CONCEPTS IN REGIONAL PULMONARY FUNCTION.

Weltzenblum E, Moyses B, Methlin G
Pavillon Laennec, Centre Hospitalier Regional, Boite Postale 426, 67091 Strasbourg Cedex, France
Clin Nucl Med; 7(3):132-141 1982

Since 1960, the date of the pioneer work of West et al, radioisotopic studies of regional pulmonary function have developed very rapidly. An important step in this field was achieved when the first perfusion imaging studies were performed in 1963-64 with I-131-labeled macroaggregates of serum albumin. Now, microspheres of human serum albumin labeled with Tc-99m are used and the quality of the scintigraphic image has improved markedly. Imaging was improved by the utilization of the large field scintillation cameras and the handling of results has considerably progressed by interfacing the camera to a computer. Since 1962, Xe-133 has been used for studying the regional distribution of ventilation (V), perfusion (Q), and V/Q ratio in the lungs. With Xe-133 the quality of scintigraphic images is not very high but the advantage of Xe-133 is that the data relating to regional ventilation and perfusion can be easily quantitated. Recently, another isotope, K4-81m, has been employed; the high energy of this insoluble, very short half-life radioisotope provides excellent images of ventilation and perfusion; combining ventilation imaging with Kr-81m and perfusion imaging with Tc-99m labeled microspheres has proven very useful, particularly in the diagnosis of pulmonary embolism. The major disadvantage of Kr-81m is that quantitation of the results is difficult. In this paper, the different methods available today for studying regional lung function are described. Special attention is paid to the possibility of quantitation of the results. The second part of the paper stresses clinical applications, including the diagnostic value and pathophysiological applications of ventilation and perfusion imaging in a variety of pulmonary (and cardiac) diseases, with special attention to cases of pulmonary embolism and chronic obstructive pulmonary diseases. (Author abstract) (71 Refs)

MISCELLANEOUS

37. NUCLEAR MEDICINAL TUMOR DIAGNOSIS WITH TUMORITROPIC RADIOPHARMACEUTICALS.

Mecev DS, Prichodjko AG, Siskina VV, Matvejenko EG
Kiewer Forschungsinstitut fur Rontgenologie, Radiologie und Onkologie, Ministeri um fur Gesundheitswesen der UkrSSR, ul. Lomonosowa 41, 252022 Kiew, USSR
Radiol Diagn (Berl); 22(6):790-798 1981

The diagnostic possibilities of the potentially tumoritropic radiopharmaceuticals (TRP) 75Se-methionine (75SM), 67Ga-citrate (67GC), 111n-citrate (111IC), 99mTc-citrate (99mTC), 99mTc-gluconate (99mTG), and 99mTc-pertechnetate (99mTPT) were studied in differential diagnosis of 1,884 patients (1542 with malignant tumors and 342 with benign tumors). Scintigraphic scans were made 0.5-72 hr after application of a particular TRP. 75SM was used in 467 patients, 67GC in 147, 111IC in 153, 99mTC in 115, 99mTG in 80, and 99mTPT in 921. The sensitivities of the TRP in detection of tumors in various locations ranged from 25% to 94.3%. Results indicate that scintigraphy using TRP is useful for differential diagnosis of benign or inflamatory conditions and malignant tumors, although none of the compounds tested were highly specific. The most appropriate compounds were 75SM and 111IC for tumors of the head and neck, 67GC for tumors of the lung and mediastinum, 99mTPT for soft-tissue tumors of the trunk and extremities, 67GC and 111IC for malignant lesions of lymph nodes located above the diaphragm, 99mTPT for malignant lesions of lymph nodes locates below the diaphragm, 111IC for bone marrow tumors, and 99mTPT for Wilms' tumors in children. (10 Refs) (In GER)

38. USE OF 111IN-BLEOMYCIN SCINTIGRAPHY IN THE DIAGNOSIS OF MALIGNANT NEOPLASMS.

Gabunila RI, Bogdasarov IuB, Zaitseva TI, Lenskaia OP, Shiriaev SV
All-Union Cancer Res. Center, Moscow, USSR
Med Radiol (Mosk); 26(12):13-17 1981

Diagnostic efficacy of scintigraphy with 111In-bleomycin was studied in 135 patients (10-71 yr old) with various malignant neoplasms and benign lesions. Among these patients, 57 had lung cancer (35 were examined preoperatively and 22 were examined during the postoperative period), 14 had benign lung tumors or chronic inflammations, 15 had colorectal cancer, 18 had malignant lymphomas, 17 had laryngeal cancer, 6 had lung metastases from synovial sarcoma, 6 had breast cancer, and 2 had mastopathy. Increased accumulation of 111In-bleomycin was detected in 32/35 patients with lung cancer; of 22 patients subjected to postoperative scintigraphy, 10 were found to have metastases in the mediastinal lymph nodes. Increased accumulation of 111In-bleomycin was observed in 15/15 patients with colorectal cancer, 16/18 patients with malignant lymphoma, 14/17 patients with laryngeal cancer, and 4/6 patients with breast cancer. There was no accumulation of the radionuclide in the patients with benign lung tumors, chronic lung inflammations, or breast mastopathy. False negative findings were associated with small tumor size. (5 Refs) (In RUS)

39. THE PLACE OF LYMPHOSCINTIGRAPHY IN THE TREATMENT OF MALIGNANT MELANOMA OF THE SK IN.

Munz DL, Altmeyer P, Holzmann H, Encke A, Hor G
Zentrum der Radiologie, Univeraitatsklinikum, Theordor-Stern-Kai 7, 6000 Frankfurt/Main 70, W. Germany
Dtsch Med Wochenschr; 107(3):86-91 1982

Lymphoscintigraphy was performed pre- or post-operatively in 42 patients with malignant melanoma of the skin. The test consisted of the injection of 1.5-2.0 mCi99mTc-labeled antimony sulfide colloid, both intracutaneously and sc, either around the primary tumor or along its edges or into the center of the excision scar or contralaterally. The draining lymph-node groups were scanned with a gamma-camera 4-6 hours after the injection. Except for one patient, the radioactive tracer had always disappeared from the injection site and had accumulated in the regional lymph-nodes. In 11 of 28 patients with melanoma on the trunk, lymphatic drainage was to more than one regional lymph-node group. In most cases with cutaneous melanoma on the trunk, lymphatic drainage could not be anatomically predicted, but easily and unequivocally identified by lymphoscintigraphy. On the other hand, lymphatic drainage of a melanoma of the head or neck, as well as of distal segments of the limbs, almost always followed anatomical expectations. Using lymphoscintigraphic findings, prophylactic lymphadenectomy could be performed selectively in 'high risk' melanomas. (Author abstract) (14 Refs) (In GER)

40. MYOCARDIAL SCINTIGRAPHY WITH TECHNETIUM-99M-DIPHOSPHONATE FOLLOWING RADIATION THERAPY OF THE THORACIC AREA.

Neumann G, Standke E, Gottschild D
Radiologische Klinik und Poliklinik des Bereiches Medizin, Karl-Marx-Universitat Leipzig, Liebigstr. 20, DDR-7010 Leipzig, E. Germany
Radiol Diagn (Berl); 22(5):690-696 1981

Myocardial scintigraphy (MS) with technetium-99m-diphosphonate (Tc-99m-DP) was performed on 30 patients receiving thoracic radiotherapy for Hodgkin's disease (14), esophageal carcinoma (4), bronchial carcinoma (3), mammary carcinoma (4), non-Hodgkin-lymphoma (2), thymoma (1), teratoma (1), or undifferentiated renal adenocarcinoma (1). MS was performed approx 2 hr after iv injection of 15 mCi Tc-99m-DP. Anterior, left anterior oblique, and left lateral views were obtained from each patient. Definitely positive findings of myocardial infarction were obtained from four patients, and questionably positive findings were obtained from three patients. The patients with definitely positive findings had received radiation doses of 1.3-16 Gray. Two of the patients with questionable findings had received radiation doses of 8 or 10 Gray. Results indicate that MS with Tc-99m-DP is capable of detecting fresh myocardial cell lesions, particularly those resulting from radiotherapy, and is independent of functional disorders. The small number of patients with detectable lesions indicates that myocardial damage is not a generalized effect of thoracic irradiation, but that radiation may act with other unknown factors to produce such damage. (8 Refs) (In GER)

SELECTED PRE-CLINICAL STUDIES

41. HISTOTOPOGRAPHY OF THE RADIOPHARMACEUTICALS 75SE-SELENIUM METHIONINE AND 75SE-SELENITE IN CRITICAL ORGANS OF THE ADULT AND EMBRYONIC ANIMAL.

Chait SE, Noroc TA
Institut fur mediziniche Radiologie, AdmW der UdSSR, ul. Koroleva 4, 249020 Obninsk, USSR
Radiobiol Radiother (Berl); 22(5):697-704 1981

To determine the radiation exposure of specific organs in patients receiving preparations containing 75Se, mice were injected iv with 75Se-selenium methionine or 75Se-selenite. Tissues were examined by histoautoradiography. In adult mice 75Se was strongly accumulated in the kidney, liver, testicle, and red marrow. In embryos 75Se was accumulated in the liver, hematopoietic bone marrow, and lens of the eye after injection of a pregnant female. Organ-specific accumulation of 75SE must be taken into account when using 75Se therapeutically. (9 Refs) (In GER)

42. ELIMINATION OF 51CR-LABELLED TARGET CELLS AS A METHOD OF IN VIVO ASSESSMENT OF IMMUNE REACTIONS.

Makowka L, Falk RE, Falk JA, Teodorczyk-Injeyan J, Nossal NA, Rotstein LE
(c/o R. E. Falk), Univ. Toronto, Room 7344, Medical Sciences Building, Ontario M5S 1A8, Canada
Folia Biol (Praha); 27(6):388-403 1981

The development of antitumor activity was assessed in vivo by assay of 51Cr-labeled tumor cells retained in the spleens of Fisher (F344) male and female rats; immune response to minor and major histocompatibility antigens was monitored in Lewis (L) male rats that received skin, heart, or hepatocyte allografts from F344, Buffalo, or Wistar-Furth rats. Syngeneic tumor lines in F344 strain rats, a methylcholanthrene-induced bladder carcinoma (FBCa) and a spontaneous mammary adenocarcinoma, were used to define the antitumor response. The effects of immunopotentiating agents, the synthetic polymer NED 137, BCG, Levamisole tablets, and Freund's complete adjuvant, were analyzed using the 51Cr elimination technique. NED 137 (30 mg/kg ip) significantly increased survival of F344 rats challenged with FBCa by iv injection or implantation; NED 137 also showed higher immunostimulation than the other immunopotentiating agents as shown by in vivo lysis of 51Cr-labeled FBCa cells. The 51Cr assay was specific and quantitated the sensitizing effect of antigens from animals differing not only at the major histocompatibility locus but in minor histocompatibility as well. The method allows assessment of the development of antitumor response and the degree of sensitization to histocompatibility antigens; results can be correlated with those from graft survival experiments. (21 Refs)

43. MECHANISMS OF DISTRIBUTION OF GALLIUM 67 IN MOUSE TUMOUR HOSTS.

Sephton RG, De Abrew S, Hodgson GS
Cancer Inst., 481 Little Lonsdale St., Melbourne 3000, Australia
Br J Radiol; 55(650):134-141 1982

In several mouse tumor models iron given parenterally not only inhibited the transport of 67Ga by plasma transferrin but also accelerated the binding of 67Ga in tumor tissue, particularly during the first hr after 67Ga injection. By 30 min, the tumor had already attained a high concentration though the 67Ga accumulated was still potentially reversible. With the passage of time equally high 67Ga concentrations were attained in tumor in iron-treated and untreated animals alike, and were maintained high as 67Ga was totally cleared from the plasma. Given IV, 125I-human transferrin was not preferentially bound in tumor whereas in muscle tissue loaded with transferrin, 67Ga was accumulated locally during the immediate postinjection phase and to an enhanced degree in iron-treated animals. A hypothesis is presented which, by drawing attention to the role of extravascular transferrin in binding and presenting 67Ga for cellular uptake, helps resolve the apparent contradictions between in vivo and cell culture findings. (Author abstract) (24 Refs)

44. LABELLED BLEOMYCIN AS A TUMOUR-LOCALIZING AGENT. II. THE EFFECT OF DOSE LOADING OF THE DIFFERENT FORMS OF 57 COBALT-BLEOMYCIN A2, B2, AND PEPLEOMYCIN ON THE TISSUE DISTRIBUTION AND TUMOUR UPTAKE IN TUMOUR-BEARING RATS.

Vos CM, Westera G
Radio-Nuclide Centre, Free Univ., de Boelelaan 1083 a, NL-1081 HV Amsterdam, The Netherlands
Eur J Nucl Med; 7(2):92-94 1982

Bleomycin A2, bleomycin B2, and pepleomycin were labeled with 57Co and injected into Wag/Rij rats that had been injected sc 5-8 wk previously with cells of rhabdomyosarcoma. All animals were killed 4 hr after injection of tumor-localizing agents, and radioactivity of tumors, blood, muscles, lungs, liver, and kidneys was determined and expressed as percentage of injected dose per gram tissue. The percentage dose/g kidney was consistent for all preparation, and was used to check reliability of other observations in the same animal. When preparations made without added carrier cobalt were used, forms I and II of 57Co-bleomycin A2 (CoblmA2), which differ in internal ligands to Co, and similar forms of 57Co-bleomycin B2 (CoblmB2) did not differ in biological behavior. Tumor:blood ratios in carrier-free preparations were significantly lower in CoblmA2 than in CoblmB2-I or 57Co-pepleomycin (Copep). With carrier Coblm present, Coblm B2-I and Copep-I showed higher tumor:tissue ratios than their respective II forms, but for CoblmA2 the II form had the higher tumor:tissue ratio. CoblmA2 complexed with formate had a pattern of tissue distribution similar to CoblmA2, form II, with carrier. Independent of the form used, carrier-free preparations of CoblmB2 and Copep showed higher tumor:tissue ratios than CoblmA2; ratios could be increased by using CoblmA2 wit h added CoblmA2-II, with carrier. (12 Refs)

REVIEWS

45. APPLICATIONS OF NMR DIAGNOSTIC IMAGING.

Sakuma S
Dept. Radiology, Nagoya Univ. Sch. Medicine, Nagoya, Japan
Nippon Rinsho; 39(11):3579-3587 1981

Expected medical applications of nuclear magnetic resonance (NMR) imaging, theory of NMR, elements of NMR's potential medical applications, history of NMR imaging methods, distribution of water in biological organisms, NMR equipment, potential medical application of NMR from the perspective of distinguishing different organs, and present status and future of NMR imaging methods were discussed. Studies have shown

that spin-lattice relaxation times of 1H in most of the water of cancerous tissues are longer than those of normal tissue, suggesting that early detection of cancers might become possible with NMR equipment. Differentiation of organs is possible with NMR. Based on differences in the 1H density distribution in water of brain tissues in patiens with brain pathology, brain morphology, sites of vascular hemorrhages in the brain, adenomas and brain tumors in the area surrounding the sites of vascular hemorrhages, necrotic areas of the brain, or adenomas, abscesses, etc. existing in the areas surrounding necrotic areas of the brain can be distinguished. With 31P NMR studies, brain tumors or abscesses can also be detected. Measurement of proton density mapping T1 was thought to be useful for examining malignant tumors. (32 Refs) (In JPN)

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SERIES CT02 No. 82/08 AUGUST, 1982

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BREAST NEOPLASMS

1. NUCLEAR MAGNETIC RESONANCE IMAGING AND EVALUATION OF HUMAN BREAST TISSUE: PRELIMINARY CLINICAL TRIALS.

Ross RJ, Thompson JS, Kim K, Bailey RA
Suite 206, Hillcrest Medical Building 1, 6803 Mayfield Road, Mayfield Heights, OH, 44124
Radiology; 143(1):195-205 1982

In vivo clinical evaluations of human mammary tissue, including normal, dysplastic, and neoplastic breasts, were initiated using the FONAR method of nuclear magnetic resonance (NMR) imaging. Spin-lattice relaxation times (T1) were deter-

HE 20.3173/2:

mined and correlated with other diagnostic modalities including mammography, xeroradiography, and sonography. Normal breasts and breasts with extensive fatty replacement were found to have the lowest T1 values, whereas T1 values of malignant tissue were elevated. T1 values for mammary dysplasia extended over a wide range, and NMR images exhibited lower proton density than normal tissue. In several patients with severely dysplastic breasts, T1 values overlapped those from patients with documented breast neoplasms. Markedly elevated T1 values were obtained from fluid-filled cysts that were well beyond the range of malignancy. (Author abstract) (17 Refs)

2. VALUE OF PRE-TREATMENT AND FOLLOW-UP SKELETAL SCINTIGRAPHY IN OPERABLE BREAST CANCER.

Pauwels EK, Heslinga JM, Zwaveling A

Dept. Diagnostic Radiology, Div. Nuclear Medicine, Univ. Hosp., Leiden, The Netherlands

Clin Oncol; 8(1):25-32 1982

Bone scintigraphy has been performed between 1973 and 1977 for preoperative detection of osseous metastases in patients with operable mammary malignancy. In 81 patients, classified as Columbia A no malignant bone lesions were detected. In 55 patients, mainly classified as Columbia B and some as Columbia C, altogether four cases with bone metastases have been found. Thus, bone scintigraphy was informative in only 4 out of 136 cases (2.9%). These four cases suffered from bone pain and/or had elevated alkaline phosphatase levels. Follow up of our group of patients over a period of 4 yr has shown that bone metastases predominantly occur in the first 2 postoperative yr. In seven patients, classified as Columbia A and in eight patients classified as Columbia B/C bone metastases were scintigraphically detected in these first 2 yr. Also in these patients bone pain and/or an elevated alkaline phosphatase level was present. It would have required approx 520 serial bone scans, each with 1/2 yr interval, to detect these 15 cases. Cost benefit evaluation has shown that both pre-operative and post-operative bone scintigraphy in patients with operable breast carcinoma is not indicated. We believe that boner pain and/or biochemical changes may serve as an indication for bone scanning in this group of patients. (Author abstract) (28 Refs)

CENTRAL NERVOUS SYSTEM NEOPLASMS

3. INDICATIONS FOR CEREBRAL SCINTIGRAPHY.

Bull U

Radiologische Klinik, Klinikum Grosshadern der Universitat, Marchioninistrasse 15, 8000 Munchen 70, W. Germany

Dtsch Med Wochenschr; 107(6):223-225 1982

Cerebral scintigraphy is indicated when cerebral tumors and vascular changes exist or are suspected. Transmission computed axial tomography (TCAT) can diagnose 98% of cerebral tumors, but scintigraphy is useful in differential diagnosis following the TCAT. When the two methods were combined, differential diagnosis and classification were achieved in 93% of meningiomas, in 89% of glioblastomas, and in 88% of metastases. (8 Refs) (In GER)

DIGESTIVE NEOPLASMS

4. LIVER LESIONS: COMPARATIVE ACCURACY OF SCINTIGRAPHY AND COMPUTED TOMOGRAPHY.

Knopf DR, Torres WE, Fajman WJ, Sones PJ

(c/o Torres) Dept. Radiology, Emory Univ. Sch. Medicine, 1365 Clifton Road, N.E., Atlanta, GA, 30322

AJR; 138(4):623-627 1982

Of 84 cases with both radionuclide and computed tomographic studies of the liver, in 54 the results of the two examinations agreed, in 14 results disagreed, and in 16 cases one of the two tests gave equivocal results. Overall accuracy in detecting or ruling out focal liver disease was 79% for scintigraphy and 98% for computed tomography. In 13 of the 14 patients in whom studies did not agree, the scintigram was falsely negative. In 10 of these 13 false-negative scintigrams, small (less than 2 cm) solitary or multiple lesions were detected on computed tomography in patients who had normal liver function studies. In seven patients in whom both studies agreed, computed tomography provided additional, extrahepatic information that altered clinical management. Scintigraphy was 86% accurate in detecting liver disease when the patient had a gastrointestinal neoplasm, but only 74% accurate for nongastrointestinal neoplasm. Computed tomography was over 94% accurate in both situations. These data indicate an advantage of computed tomography as the initial screening examination for space-occupying lesions of the liver, especially in patients with a primary diagnosis of nongastrointestinal neoplasm (Author abstract) (12 Refs)

5. A PROSPECTIVE STUDY OF HEPATIC IMAGING IN THE DETECTION OF METASTATIC DISEASE.

Smith TJ, Kemeny MM, Sugarbaker PH, Jones AE, Vermess M, Shawker TH, Edwards BK

(c/o Sugarbaker) Surgery Branch, Div. Cancer Treatment, NCI, NIH, Building 10, Room 10N116, Bethesda, MD, 20205

Ann Surg; 195(4):486-491 1982

This prospective study of 80 patients compared the results of liver scintiscan, ultrasound, and CT scan to the objective findings recorded at laparotomy. Analysis of these data revealed no significant differences in sensitivity, specificity, or accuracy among these three imaging procedures, although a trend toward increased accuracy of the CT scan was noted. In a composite analysis, the accuracy was not improved by combining two or all three of these examinations. A lesion by lesion analysis revealed the inability of any of the three currently used techniques to accurately detect lesions less than 3 cm in diameter. (Author abstract) (18 Refs)

6. DIAGNOSIS OF INTRAHEPATIC SPACES: LIVER SCINTIGRAPHY, SONOGRAPHY, AND TRANSMISSION COMPUTED TOMOGRAPHY.

Bull U, Kessler M, Scherer U

Radiologische Klinik und Poliklinik, Universitat Klinikum Grosshadern, Marchioninistrasse 15, 8000 Munchen 70, W. Germany

Dtsch Med Wochenschr; 107(7):263-264 1982

Diagnosis of intrahepatic spaces using scintigraphy, sonography, and transmission computed axial tomography (TCAT) was discussed. Reliability, practical application, and amount of correct diagnosis obtained were considered. Using sonography small (up to 2 cm diameter) liver metastases were diagnosed in 55% of patients, using scintigraphy only in 32%, while with TCT 72% were diagnosed correctly. Results obtained with old

and the most advanced technical equipment were compared. (8 Refs) (In GER)

7. SERIAL CEA ASSAYS AND LIVER SCINTIGRAPHY FOR THE DETECTION OF HEPATIC METASTASES FROM COLORECTAL CARCINOMA.

Szymendera JJ, Wilczynska JE, Nowacki MP, Kaminska JA, Szawlowski AW
Inst. Oncology, P.O. Box 47, PL-00 973 Warsaw 22, Poland
Dis Colon Rectum; 25(3):191-197 1982

Of 340 patients with histologically proven colorectal carcinoma, hepatic metastases were diagnosed in 90 (26%), in 50 at the time of initial surgery (synchronously) and in 40 during the postoperative follow-up (metachronously). At the time of initial surgery, plasma carcinoembryonic antigen (CEA) levels were markedly elevated in patients with synchronous metastases and normal or only moderately elevated in those with metachronous metastases. During follow-up, CEA levels in the entire group of patients with metastases remained normal in 8% and rose in the remainder: very quickly in 85% and slowly in 15%. Hepatic metastases were diagnosed by strict scintigraphic criteria in 70% of patients and were suggested by liberal criteria in the remainder. During follow-up, hepatic metastases progressed in the scintigraphic image from those defined by liberal to those diagnosed by strict criteria. In two-thirds of the patients, liver scintigraphy proved to be superior to the CEA test in diagnosing hepatic metastases by strict criteria; in the majority of the remainder of patients, the CEA test, particularly in cases with a pattern of fast increase of CEA in plasma, suggested metastases before a definite diagnosis could be made by liver scintigraphy. In only 3% of the patients neither liver scintigraphy nor the CEA test were indicative of metastases. Thus, the two diagnostic modalities, when combined, could attain a sensitivity of 97%, when patients with persistently rising CEA levels and concomitant liver lesions defined by the liberal criteria were grouped with those for whom scintigraphy was unequivocal. (Author abstract) (34 Refs)

8. DIAGNOSIS AND TREATMENT OF HEPATIC METASTASES OF COLO-RECTAL NEOPLASMS.

Pector JC
Service de Chirurgie, Institut Jules Bordet, Bruxelles, Belgium
Rev Med Brux; 3(1):29-35 1982

Diagnosis and treatment of hepatic metastases are discussed. Clinical symptoms, such as jaundice, hepatomegaly, palpable liver masses, and ascites, are present only in the later stages of liver tumor development. Alkaline phosphatase is the most commonly measured enzyme for the evaluation of liver metastases. Liver enzymes are of little diagnostic importance since abnormalities may reflect benign or malignant disorders. Carcinoembryonic antigen levels, although not specific for liver metastases, may be useful in the diagnosis of recurrence. Scintigraphy is the classic examination for liver metastases. Echography and tomodensitometry may also be useful in the evaluation of liver tumors while arteriography is of little value. Histologic evaluation may involve percutaneous needle biopsy, laparoscopy, or laparotomy. Surgical treatment is useful only in the presence of a single metastasis or if many metastases are localized in a single liver lobe. The antimitotic agent most commonly used to treat liver metastases is 5-fluorouracil (5FU). Only the combination of 5FU with semustine has produced responses superior to those resulting from 5FU alone. Radiotherapy is of little use in the treatment of liver metastases. Locoregional treatments of liver metastases, including ligature of the hepatic artery and regional chemotherapy (liver arterial perfusion, portal perfusion, arterial perfusion after ligature of hepatic artery, portal perfusion after ligature of hepatic artery) are described. (31 Refs) (In FRE)

9. CHEMICAL OR IMMUNOLOGICAL EVIDENCE OF OCCULT BLOOD IN STOOL IN THE EARLY DIAGNOSIS OF COLORECTAL CARCINOMA.

Heinrich HC, Benn HP
Abteilung Medizinische Biochemie, Physiologisch-Chemisches Institut, Universitat Hamburg, Martinistr. 52, D-2000 Hamburg 20, W. Germany
Dtsch Med Wochenschr; 107(8):307-310 1982

The values of chemical and immunological tests for occult blood (OB) in the stool are compared based on a review of literature. The value of any OB. test depends on the sensitivity and specificity of the test. Chemical OB tests produce false positive results in 5-15% of cases. Available chemical tests are not specific for human Hb. As a result, animal and plant hemoproteins in the diet may be detected in the stool. OB distribution in the stool may be quite uneven, leading to misleading results of random sampling. Tests using 51Cr or 59Fe have a sensitivity approx double that of other chemical tests and can detect losses of 10 ml or more blood/day. Colorectal polyps and carcinomas may cause blood losses as small as 1-20 ml/day. Immunological OB tests detect human Hb or peptide chains of Hb at levels of 0.075 ml or less blood/100g stool homogenate. Immunological methods are currently not economically feasible as screening methods, however. Patients to be examined should, therefore, avoid dietary hemoproteins and large amounts of ascorbic acid prior to chemical OB tests. Tests should be performed on 3-6 successive stools. All patients with positive chemical results should be tested by immunological methods. Only patients with positive immunological or radioisotopic test results should undergo endoscopic or radiological studies to determine the source of bleeding. (8 Refs) (In GER)

10. BILIARY TRACT CHOLESCINTIGRAPHY USING TECHNETIUM-99M-LABELED DISOFENIN.

Matolo NM, Stadalnik RC
Dept. Surgery, Univ. California, 4301 X St., Room 257, Sacramento, CA, 95817
J Surg Res; 32(3):202-207 1982

Technetium-99m-labeled disofenin is a new iminodiacetic acid analog for imaging the biliary tract and the gallbladder. Biliary cholescintigraphy with 99mTc-disofenin was performed on 148 patients referred for evaluation of hepatobiliary tract disease. Four millicuries was administered intravenously to nonjaundiced patients and 7 mCi to jaundiced patients. Scintigraphy was performed on patients in supine position and was accomplished via large-field-of-view camera with a low-energy, all-purpose collimator. Technetium-99m-labeled disofenin rapidly cleared the blood which permitted excellent images of the biliary system with minimal interference from renal activity in only 11% of the patients. Of the 34 patients confirmed operatively and histologically to have acute cholecystitis, 32 had positive 99mTc-disofenin cholescintigram, a sensitivity rate of 94%. Only two of the eight patients with chronic cholecystitis had positive scan with nonvisualization of the gallbladder. This is not surprising, since scintigraphic study may be normal in patients with chronic cholecystitis if the cystic duct is patent. A normal biliary tract was detected in 63% of our jaundiced patients (25/40), thus excluding biliary tract disease. Radioactivity was definitely identified in the gastrointestinal tract when the serum bilirubin level was as high was 27.3 mg/100 ml, thus differentiating hepatocellular disease

from complete extrahepatic biliary tract obstruction. However, in six patients (15%), 99mTc-disofenin cholescintigram could not differentiate between liver disease and biliary tract obstruction. It is concluded that 99mTc-disofenin has rapid blood clearance, which permits satisfactory images of the biliary system in a variety of hepatobiliary diseases encountered in routine clinical practice. It is particularly sensitive in the diagnosis of acute cholecystitis. (Author abstract) (20 Refs)

11. SCINTIGRAPHY OF BILIARY SYSTEM IN UPPER ABDOMINAL SURGERY.

Pfitzmann KF, Deckart H, Brunhober J

II. Chirurgische Klinik, Stadtisches Klinikum Berlin-Buch, Zeppernicker Strasse 1, 1115 Berlin, E. Germany

Z Aerztl Fortbild; 76(1/2):30-36 1982

Scintigraphy (SC) of biliary system (BS) with 99mTc-diethyl-IDA was very useful in the diagnosis before and after surgery. Of 15 patients with cholelithiasis, only one had normal kinetics in the BS. Forty patients with jaundice (JA) were studied, 13 had parenchymal JA and 27 had obstructive JA. Differentiation between the two types of jaundice with SC was difficult. SC can produce good results, if bilirubin values are less than 25 mg/100 ml. Duodenal-gastric reflux can be diagnosed with SC. SC can be helpful in the diagnosis of pancreatic tumors and cysts. (16 Refs) (In GER)

ENDOCRINE NEOPLASMS

12. ON THE VALUE OF SCINTIGRAPHIC FINDINGS AND CYTOLOGICAL DIAGNOSIS IN RECURRENT GOITER.

Florack G, Kniemeyer H, Jaeschock R

Chirurgische Klinik A, Universitat Duesseldorf, Moorenstrasse 5, D-4000 Dusseldorf, W. Germany

Therapiewoche; 32(9):1214-1219 1982

Of 2,842 thyroid operations, 177 were for treatment of recurrent goiter. Recurrence was benign in 158 cases and malignant in 19 cases. In all cases of malignancy the primary tumor was benign. Four cases involved oncocytic adenoma. Scintigraphy demonstrated thyroid defects including regressive alterations, calcification, formation of cysts, and inflammation. 'Cold' nodes were found by scintigraphy in 1,335/2,665 primary goiters and 103/177 recurrent goiters. Cold nodes showed the highest rate of malignancy (14.6% in recurrent cases and 11.5% in primary cases). Among malignant goiters 83.7% of primary and 83.3% of recurrent cases were indicated as cold nodes. Other types of scintigraphic findings showed a malignancy rate of 2.7-3.3%. Preoperative fine-needle aspiration (FNA) was performed on 687 patients, including 50 with recurrent goiter. Cytological examination produced false positive findings in a high percentage of cases due to difficulties in evaluation of follicular and oncocytic tumors. Difficulties were encountered in obtaining reliable samples from recurrent nodular goiter. Scintigraphy and FNA are indicated as complementary diagnostic methods. Clinical signs of malignant transformation, however, indicate the necessity of surgery, even if cytological findings are negative. (25 Refs) (In GER)

13. PROSPECT FOR THE TREATMENT OF THYROID CANCER WITH POST-OPERATIVE IRRADIATION.

Liaw KY, Chang-Chien Y, Tzen KY, Chen CC, Huang SC, How SW, Chang CC, Chen FW

Dept. Surgery, Coll, Medicine, Natl. Taiwan Univ., Taipei, Taiwan, Republic of China

Taiwan I Hsueh Hui Tsa Chih; 80(11):1240-1252 1981

Between 1958 and 1980, 83 patients (61 females, 22 males) with thyroid cancer were treated with thyroidectomy and postoperative radiation therapy (RT); 63 were treated only with I131 and 20 with Co60 with or without I131 RT. RT was indicated in patients with postoperative residual lesions (17 patients), distant metastases (31), recurrent lesions (7), or those needing prophylactic treatment (28). The mean I131 dose for prophylactic, recurrent, residual, and metastatic lesions was 68, 121, 141, and 182 mCi, respectively. Forty-three patients were followed for 5 yr or more. Five and 10-yr survival rates were, respectively, 100% and 100% for the prophylactic group; 85.7 and 75%, for the recurrent group; 80% and 66.7% for the residual group; and 72.2% and 16.7% for the metastatic group. Five of eight deaths were due to metastatic thyroid carcinoma. Av survival from diagnosis to death was 3.5 yr (range, 6 mo to 9 yr). Use of I131 for treatment of distant metastases and for residual or recurrent tumors is recommended; postoperative irradiation may provide long-term palliation or may be curative in some patients. (11 Refs)

14. STRUMA MALIGNA: RESULTS OF TREATMENT AND FOLLOW-UP.

Borner W, Reiners C

Abteilung Nuklearmedizin, Universitatskliniken, Josef-Schneider-Strasse 2, D-8700 Wurzburg, W. Germany

Therapiewoche; 32(8):1049-1057 1982

Treatment of thyroid cancers (TC) is discussed. TC include follicular (46% of cases), papillary (33%), anaplastic (13%), and C-cell (5%) carcinomas. The 5-yr survival rate is 87% for follicular TC, 83% for papillary TC, and 70% for C-cell TC. Prognosis is poor for anaplastic TC, with a 50% survival time of 94 days. Papillary TC is treated by a sequence including thyroidectomy (TE), radioiodine therapy (RIT), suppressive thyroid hormone therapy (STH), and percutaneous radiotherapy (PRT). Follicular TC is treated by the same sequence plus chemotherapy (CT). Occult microcarcinoma is treated by lobectomy followed by STH. C-cell carcinoma is treated by TE, RIT if required, substitutive thyroid hormone therapy, PRT, and CT. Follow-up plays a major role in therapy and requires clinical/internist control at 6-mo (later 1-2-yr) intervals. 131I is the preferred nuclide for RIT. Scintigraphy is used to determine the requirement for RIT. Skeletal scintigraphy with 99mTc is used to detect skeletal metastases. Follicular and papillary TC can be detected by tests for the tumor marker thyroglobulin. C-cell carcinoma can be detected by tests for calcitonin. Follow-up care should include monitoring for side-effects of RIT (bone marrow aplasia and leukemic transformation) and surgery (recurrent paresis and tetany); psychological counseling should also be included. (53 Refs) (In GER)

15. TC-99M PERTECHNETATE UPTAKE IN A THYMOMA: CASE REPORT.

Wilson RL, Cowan RJ
(c/o Cowan), Bowman Gray Sch. Medicine, 300 S. Hawthorne Road, Winston-Salem, NC 27103
Clin Nucl Med; 7(4):149-150 1982

A case is reported of Tc-99m pertechnetate accumulation within an anterior mediastinal thymoma during a search for substernal goiter. This reemphasizes the non-specificity of Tc-99m pertechnetate uptake and the need for caution in using this agent to detect ectopic thyroid tissue. (Author abstract) (10 Refs)

16. CUSHING'S SYNDROME. ANALYSIS OF 18 CASES.

Skalkeas G, Gogas JG, Sechas MN, Kostakis A, Pavlatos F
(c/o Gogas) 2nd Dept. Propedeutic Surgery, King Paul's Hosp., Athens, 609, Greece
Am J Surg; 143(3):363-366 1982

Eighteen patients with Cushing's syndrome were analyzed retrospectively. Eleven patients had diffuse or adenomatous hyperplasia, 5 an adenoma and 3 a carcinoma. Iodocholesterol scanning provides considerable help in localization of the disease. Surgical treatment, while curative for benign cases, affects only slightly the course of malignant disease. (Author abstract) (16 Refs)

GENITOURINARY NEOPLASMS

17. INDICATIONS AND LIMITATIONS OF THE METHODS USED IN NUCLEAR MEDICAL STUDY FOR UROLOGY.

Vahlensieck W, Doppelfeld E, Winkler C
Urologische Klinik, Universitat Bonn, D-5300 Bonn, W. Germany
Urologe [B]; 22(1):12-18 1982

Static renal scintigraphy is indicated for screening and evaluation of renal anomalies, aplasias, and tumors when excretion urography provides insufficient information, or when use of contrast medium presents unnecessary risks. Scintigraphy can be used to study renal function and morphology in cases of mobile kidney or renal obstruction and to monitor the course of chronic renal conditions, trauma, and kidney transplants. Radioisotopic clearance studies can be used to determine the necessity of nephrectomy or less extensive procedures. Radioisotopic methods are also applicable to studies of residual urine content, reflux, and hormone determinations. (10 Refs) (In GER)

18. AUGMENTED ILIOPELVIC LYMPHOSCINTIGRAPHY: APPLICATION IN THE MANAGEMENT OF GENITOURINARY MALIGNANCY.

Ege GN
Dept. Nuclear Medicine, Princess Margaret Hosp., Toronto, Ontario, Canada
J Urol; 127(2):265-269 1982

Bilateral perianal injection of 99mtechnetium antimony sulfide colloid into the ischiorectal fossa has demonstrated effectively the groups of nodes constituting the internal iliac or pelvic lymphatics, confirming normal anatomic variability in the number and topography of the nodes visualized in individual patients. By supplementing this technique with bilateral dorsal pedal injection of radiocolloid, with the resultant visualization of the external iliac lymphatics, the integrity of the entire iliopelvic lymphatic network can be better appraised. Available histopathological and surgical data correlate with the lymphoscintigraphic interpretation. (Author abstract) (14 Refs)

19. PROPHYLACTIC INSTILLATION OF YTTRIUM-90 IN JEWETT 0 BLADDER CARCINOMA.

Donn F, Becker H, Kaufmann J, Montz HR
Urologische Universitatsklinik, Martinistrasse 52, 2000 Hamburg 20, W. Germany
Therapiewoche; 32(5):504,507 1982

In a randomized prospective study 19 patients with Jewett 0 carcinoma of the bladder were treated by instillation of yttrium-90. Instillation was performed 4-6 wk after transurethral electroresection (TUR) and repeated after an additional 8-12 wk, for a total dose of approx 3,000 rad. Tumors recurred in 5/19 patients treated with yttrium-90, compared with 12/19 patients receiving no further treatment after TUR. No local radiation effects were noted during or after treatment. The effectiveness of yttrium-90 is indicated. (2 Refs) (In GER)

HEAD AND NECK NEOPLASMS

20. SCINTIGRAPHY IN THE PROBLEM OF METASTASES FROM CANCER OF THE LARYNX.

Salvatore M, Avitabile G, Muto V
Inst. for Study and Treatment of Tumours, 'Senatore Pascale' Foundation, Capella Cangiani, 80100 Napoli, Italy
Rev Laryngol Otol Rhinol (Bord); 102(11/12):535-541 1981

The role of scintigraphic methods in detection of local lymph node metastases was investigated. Lymph node scintigraphy (LNS) techniques and oncoscintigraphy (OS) techniques can be applied in exploration of the lymph node (LN) system. LNS is 'indirect' because LN are visualized without injecting directly into the vessel, and morphological and dynamic-functional studies of the area are possible. LNS shows the thoroughness of LN removal. A great number of radiopharmaceutical drugs have been tested for OS. The resulting positive image is preferable to the negative image of LNS techniques. Mercury dichloride (MDC) and gallium-67 citrate (GC) are most frequently used. The application of labeled bleomycin gives satisfactory results at the focus level and for very small lesions. Se-methionine and iron technetium ascorbate gives poor results. Results obtained with MDC and GC in patients with or without metastases are shown. Fixation was termed 'good' when accompanied by sharp visualization of the focus and activity equal or superior to that found in the hepatic region (HR). 'Fair' fixation was obtained when the activity was less by up to 20% than that found in HR. 'Poor' fixation indicated very poor or no visualization of the disease process and activity at least 20% less than that in the HR. GC gave a higher percentage of good fixation and lower incidence of false positive and negative results. Scintigraphic techniques are also useful in checking the results of radiotherapy but less so in judging the regression of metastases, since irradiation may inhibit fixation, particularly when checking for recurrence after a long interval. (18 Refs)

21. RADIONUCLIDE SALIVARY GLAND IMAGING OF MAXILLARY SINUS ONCOCYTOMA.

Noyek AM, Greyson ND, Cooter N, Shapiro BJ
Suite 207, 99 Ave. Road, Toronto, Ontario M5R 2G5, Canada
J Otolaryngol; 11(1):17-22 1982

The case of a 62-yr-old white male with a papillary oncocytoma of the maxillary sinus is presented. The tumor was successfully imaged using a Tc99m pertechnetate salivary scan, with a delayed 3.5 hr image. Light and electron microscopy confirmed the histologic and ultrastructural features of a papillary oncocytoma. The ability of an oncocytoma to accumulate pertechnetate, even in ectopic salivary location, indicates that the technique may be valuable in diagnosing functional oncocytomas. (11 Refs)

HEMATOLOGIC, RETICULOENDOTHELIAL, AND LYMPHATIC NEOPLASMS

22. GA-67 IMAGING IN HODGKIN'S DISEASE.

Huys J, Schelstraete K, Simons M
Dept. Radiotherapy and Nuclear Medicine, Univ. Hosp., De Pintelaan 135, B-9000 Ghent, Belgium
Clin Nucl Med; 7(4):174-179 1982

In order to answer the question if Ga-67 imaging has a practical utility for the management of the patient with Hodgkin's disease, 108 scans performed on 60 patients were reviewed. When used during the initial staging of the disease or during restaging because of recurrences, Ga-67 imaging - at least in our experience - gave many false negative results in the cervical, axillary and inguinal areas, whereas the majority of true positive scans was found at the mediastinal level (including the lower mediastinum), and also in the lung parenchyma and the upper epigastric regions. Because of its lack of sensitivity, Ga-67 imaging cannot replace other staging procedures, but nevertheless is a valuable adjunctive test, as it can identify tumor localization that may have remained undetected by other methods. Fifty-four scans were performed to monitor treatment with radiation therapy or chemotherapeutic agents. Disappearance or decrease of Ga-67 uptake after treatment usually corresponded to a disappearance or regression of the tumor as ascertained by other methods. When the treatment was shown to be ineffective, Ga-67 uptake persisted or even became more prominent. When, during follow-up, a new concentration of Ga-67 appeared at the original location or elsewhere, a relapse was extremely likely. However, one must be aware of false positive images. In our material, no correlation was found between the intensity of the Ga-67 uptake and the histological subtypes of Hodgkin's disease. Neither did we observe any relation to the blood sedimentation rate or serum iron levels. (Author abstract) (14 Refs)

23. VISCERAL INVOLVEMENT IN HODGKIN'S DISEASE.

Laurens A, Lagrosse JP, Du Bourguet F, Lesbordes JL, Martoia R
H.I.A. du Val-de-Grace, 74, boulevard de Port Royal, Paris 75005, France
Med Armees; 9(9):829-834 1981

Locations and characteristics of visceral involvement in Hodgkin's disease (HD) are described for 137 patients (123 males, 14 females; 15-86 yr old) previously described in the literature and for 34 newly observed patients. The most frequent sites of involvement among the 34 HD patients included bone (17 patients), bone marrow (7), lungs (14), and liver (5). Bone marrow involvement occurs in 10-20% of literature cases and in 13.1% of the new series of 34 patients. Bone involvement is most often found in the spine and is commonly observed in iliac, sternal, and costal bones. Pain is the most common symptom although sternal and costal tumors and general deterioration of health are commonly observed. Osteolytic lesions are commonly observed upon radiography. Preclinical bone involvement can be detected by scintigraphy. The biology, histology, and progression of bone involvement in HD is described. Bone marrow involvement is not common in HD. Histologic characteristics of bone marrow involvement are described. Pulmonary involvement is found in 10-20% of HD cases in general and in 9.4% of the current series. Pulmonary lesions are more common late in HD. Clinical signs of pulmonary involvement include cough, expectoration, and rales. Radiographic indications of lung involvement are variable. Bronchoscopy and other diagnostic technics are described. Following the discovery of either pulmonary or hepatic involvement in HD, the prognosis is poor. Hepatic lesions are found in 10% of cases and 3.6% of the 34 patients examined here. Hepatomegaly is the most common symptom of liver lesions. Biology, scintigraphy, and histology of hepatic involvement in HD are considered. Other visceral involvement in HD is described. (54 Refs) (In FRE)

24. RADIOLOGIC FEATURES OF INTRATHORACIC LYMPHOMA.

Stark P
Dept. Radiology, Massachusetts General Hosp., Boston, MA
Appl Radiol; 11(2):75-77,80,82-83,85-87 1982

Radiologic features of intrathoracic lymphoma are discussed. The most common intrathoracic presentation of Hodgkin's disease is lymphadenopathy in the mediastinum, hilar regions, or both, initially found in almost half of patients. The lung parenchyma may eventually be involved in up to 40% of cases; spreading occurs along the efferent lymphatics which parallel the bronchovascular bundles. In non-Hodgkin's lymphoma, the thorax is the primary site in only 4% of cases, but lung involvement is eventually seen in up to 50%. The superior and anterior compartments are involved in about 45% of cases of non-Hodgkin's lymphoma, compared to 90% of Hodgkin's disease cases. Nonmalignant lymphoid disorders pose problems in differential diagnosis, including lymphocytic interstitial pneumonitis, pseudolymphoma, lymphomatoid granulomatosis, giant follicular hyperplasia, and immunoblastic lymphadenopathy. In differential diagnosis of lung parenchymal lymphoma, the following entities should be considered: infection, pulmonary infarction, drug reaction, pseudolymphoma, bronchioalveolar carcinoma, alveolar sarcoidosis, and lipid pneumonia. Routine x-ray examination supplemented by chest fluoroscopy, including a barium swallow, will outline most cases of intrathoracic lymphoma. Gallium 67 scanning, full lung tomography, and computed tomography are useful in diagnosis. (12 Refs)

25. RADIOGRAPHY AND BONE SCINTIGRAPHY IN MULTIPLE MYELOMA: A COMPARATIVE ANALYSIS.

Ludwig H, Kumpan W, Sinzinger H
Div. Diagnostic Radiology, Univ. Vienna, Vienna, Austria
Br J Radiol; 55(651):173-181 1982

The sensitivity of radionuclide imaging for detecting skeletal lesions was compared with that of radiography by evaluating 573 different anatomical sites in 41 patients with multiple myeloma. Radiography revealed a significantly greater number of myeloma-related bone lesions than did radionuclide imaging.

Of the 179 myeloma-related bone lesions detected when both techniques were applied, 163 were seen by radiography and 82 by radionuclide imaging. Ninety-seven lesions were detected by radiography alone and 16 lesions seen by scintiscanning only, yielding a sensitivity of 91% for the former and and of 46% for the latter technique. Radionuclide imaging proved superior to radiography only occasionally in the rib cage, and rarely in other anatomical sites. These findings suggest that radiography is the method of first choice in obtaining a skeletal survey in patients with multiple myeloma. In cases with continued pain, unexplained by standard radiography, the skeletal survey should be supplemented by tomography and radionuclide imaging. (Author abstract) (15 Refs)

26. RADIOLOGICAL AND SCINTISCAN DIAGNOSIS AND FOLLOW-UP IN PLASMOCYTOMA.

Brassow F, Crone-Munzebrock W
Radiologische Klinik, Universitatskrankenhaus, Hamburg-Eppendorf, Martinistrasse 52, 2000 Hamburg 20, W. Germany
Roentgenblaetter; 35(2):49-53 1982

Results of conventional x-ray (CXR) and scintigraphy (SG) of 32 patients (22 men and 10 women, 54-70 yr old) with bone involvement by plasmocytoma were compared. Single bone lesions were found in 6 patients and multiple lesions in 26 patients. SG was performed 2-4 hr after iv injection of 10-20 mCi radionuclide containing 99mTc. All patients received high-voltage therapy for at least one lesion. CXR and SG were repeated 3-6 mo after irradiation. SG detected accumulations of tracer in 85% of lesions detected by CXR; the extent of 30% of these lesions was underestimated by SG. SG failed to detect 15% of lesions detected by CXR. Fractures were detected in 37 cases by CXR. SG indicated extreme accumulations of tracer in only eight fractures and did not indicate any abnormality in six fractures. Of 12 fractures detected by CXR, SG indicated distinct increases in tracer activity in 8 cases and slight increases in 4 cases. In 32 patients with a total of 37 lesions treated by high-voltage therapy, CXR did not detect changes in the irradiated field. SG showed reductions in tracer activity, indicating tumor regression in 34 lesions; increases in tracer activity, indicating tumor progression, were detected in 3 patients. New occurrences of bone lesions were detected in 14 cases by SG and confirmed by CXR. Five new lesions were detected by CXR but not by SG. SG evidently cannot replace CXR for diagnosis of bone lesions resulting from plasmocytoma, but is of value in monitoring response to therapy. (9 Refs) (In GER)

MUSCULOSKELETAL NEOPLASMS

27. INCREASED PYROPHOSPHATE RIB UPTAKE: CLINICAL CORRELATION.

Talarico LJ, Shalaby OF, Abdel-Dayem HM, Leslie EV
(c/o Abdel-Dayem), State Univ. New York Buffalo, Erie County Medical Center, 462 Grider St., Buffalo, NY, 14215
J Surg Oncol; 19(3):162-164 1982

Two hundred and thirty-one patients had 270 bone scans. Increased rib uptake was correlated with radiological findings. Interpretation of results whether due to benign or to metastatic disease depends on other observations. These include whether the uptake is localized or along the rib outline, single or multiple, and associated with other abnormal uptake in the rest of the skeleton. Abnormal rib uptake was encountered in 23% of patients scanned for malignant disease and 10% of patients scanned for benign conditions. In the first group 34% were true positive and of these, rib lesions were multiple in 32% and solitary in 2%. In 20% the rib uptake was due to benign conditions and in 46% it was indefinite because of absent radiological findings. In this last difficult group 17% were due to probably early rib metastases and 29% were due to benign causes. Rib metastases were missed in only two cases, 1.1%. One case was multiple myeloma and the other was direct extension from underlying anaplastic lung carcinoma. (Author abstract) (6 Refs)

RESPIRATORY AND CARDIOVASCULAR NEOPLASMS

28. THE USE OF RADIONUCLIDE SCANNING IN THE DIAGNOSIS OF PULMONARY METASTASES.

Mensch-Dechene J, Silbert D, Merlier M
Centre Chirurgical Marie Lannelonque, 133, avenue de la Resistance, 92350 Le Plessis Robinson, France
Ann Chir; 36(2):104-105 1982

Ventilation and perfusion scintigraphy was used as a diagnostic tool in 55 cases of pulmonary metastases and in 455 cases of bronchial cancers. Types of cancer included 337 squamous cell carcinomas, 55 glandular tumors, and 63 undifferentiated or anaplastic tumors. Surgical treatment included 132 lobectomies (29%), 159 pneumonectomies (35%), and 69 exploratory thoracotomies (15%). The percentage of ventilation-perfusion dissociations and significant functional loss of a lung was zero in nodular pulmonary metastases. This percentage (4% with ventilation-perfusion less than 15% of normal) was still small in patients having peripheral glandular cancer, but the number rose sharply with patients having squamous cell carcinoma (12%) and undifferentiated carcinoma (30%). Based on results of this study, pulmonary scintigraphy is not considered essential in secondary nodular type lung cancer. The functional loss of a lung or the loss of its perfusion function is a determining factor in prognosis. Functional loss is indicative of a process of extension which lessens the feasibility of surgical treatment. (no Refs) (In FRE)

29. PERFUSION AND VENTILATION LUNG SCANNING IN THE PREOPERATIVE EVALUATION ON BRONCHOGENIC CARCINOMA.

Brune J, Munsch R, Gamondes J, Wiesendanger T, Serain F
Service de Broncho-pneumologie, Hopital Cardio-Vasculaire et Pneumologique, B.P. Lyon-Monchat, Lyon, France
Ann Chir; 36(2):95-101 1982

Ninty-five patients with primary bronchial cancers were evaluated preoperatively with ventilation and perfusion scintigraphy (VPS). Radiologically, there were 26 peripheral cancer and 70 central cancers which had invaded the pulmonary vessels. Histological examination revealed 72 squamous cell carcinomas (75%), eight undifferentiated small cell carcinomas (10.4%), and two adenocarcinomas (2.1%). In four cases, the histological type was not established. The most common surgical procedures were pneumonectomy (34), and lobectomy (14). In 25/61 cases treated surgically, ganglionic mediastinal metastases were found. In 70/96 cancers studied, circulatory problems were superimposed on ventilation difficulties. In 21 patients, the circulatory problems were more involved than the ventilation problems. Scintigraphy alone was not able to dem-

onstrate the exact perfusion obstruction mechanism. In 44/95 patients (46.3%), the results of VPS were normal outside the tumor zones. In 51 cases, pathologic results were obtained and 80% of these cases (41) presented wash-in distribution difficulties and problems with blood distribution accompanied by trapping at wash-out. In order to make diagnostic and therapeutic decisions concerning bronchial cancer, it is recommended that the results of VPS be correlated with radiographic and endoscopic findings. (11 Refs) (In FRE)

30. BRONCHOGENIC CARCINOMA LOCATED IN THE AORTIC WINDOW. THE IMPORTANCE OF THE PRIMARY LESION AS A DETERMINANT OF SURVIVAL.

Levett JM, Darakjian HE, DeMeester TR, Golomb HM, Kirchner PT, Lu CT, MacMahon H, Gordon LI, Sternberg P
(c/o DeMeester) Dept. Surgery, Univ. Chicago, Box 440, 950 E. 59th St., Chicago, IL, 60637
J Thorac Cardiovasc Surg; 83(4):551-562 1982

Thirty-four patients with an aortic window lesion were carefully staged with gallium scans and mediastinoscopy according to the TNM classification system for carcinoma of the lung. All were in Stage III. Twenty-five patients had non-oat cell carcinomas (15 squamous cell, 8 adeno-, 2 large cell) and 9 had oat cell carcinomas. Quantitative ventilation-perfusion lung scans were particularly helpful in verifying the subaortic location of the tumor by showing a less than 20% interference with pulmonary blood flow or ventilation secondary to left mainstem bronchus or pulmonary artery invasion. Decision for resectability in 13 Stage III M0 patients was based on the length of the uninvolved proximal left main pulmonary artery seen on pulmonary arteriogram. Eight patients (7 non-oat cell and 1 oat cell) had resection after radiation and prior to chemotherapy (after 2 cycles of chemotherapy and prior to radiation therapy for the oat cell) with a resultant survival rate better than those of M0 and M1 non-oat cell or oat cell patients without resection. The survival rates of nine non-oat cell M0 patients, nine non-oat cell M1 patients, and eight oat cell patients, all without resection, were not statistically different. This similarity in survival rates is explained by the observation that 38% of the non-oat cell M1, 71% of the non-oat cell M0, and 63% of the oat cell patients died from complications of their primary tumor. Patients with aortic window lesions, irrespective of their histology, have an extremely poor prognosis due to the high incidence of lethal complications of their primary tumor. Complete resection when feasible, as judged by pulmonary arteriography, provides the best control of the primary tumor and, as a consequence, gives longer survival. (Author abstract) (10 Refs)

MISCELLANEOUS

31. USE OF RADIOLABELED MONOCLONAL ANTI-CEA ANTIBODIES FOR THE DETECTION OF HUMAN CARCINOMAS BY EXTERNAL PHOTOSCANNING AND TOMOSCINTIGRAPHY.

Mach JP, Buchegger F, Forni M, Ritschard J, Berche C, Lumbroso JD, Schreyer M, Girardet C, Accola RS, Carrel S
Ludwig Inst. Cancer Res., Lausanne Branch, Univ. Lausanne, Epalinges, Switzerland
Immunol Today; 2(12):239-248 1981

Data on Paul Ehrlich's concept of the 'magic bullet' via the use of radiolabeled antibodies as tracers for tumor localization are presented. The first successful detection of carcinoma by external scanning in patients injected with purified 131I labeled anti-carcinoembryonic antigen (CEA) antibodies was reported in 1978. Scanning performed 48 hr after injection detected almost all the CEA producing tumors. In current clinical studies, patients were selected who were scheduled for tumor resection. They were injected simultaneously with 1 mg of goat anti-CEA antibodies labeled with 1 mCI of 131I and the same amount of normal goat IgG labeled with 0.2 mCI of 125I. Using this paired labelling methods, specific uptake of antibodies in tumors was up to 5 times higher than that of control normal IgG. Three possible ways to improve the sensitivity and specificity of immunoscintigraphy as a technique for tumor localization were discussed: (1) use of antibody fragments, (2) use of monoclonal antibodies against CEA, and (3) use of tomoscintigraphy to detect radioactivity localized in the tumor. (26 Refs)

32. PRELIMINARY EXPERIMENTAL RESULTS IN HUMANS AND ANIMALS WITH A SUPERCONDUCTING, WHOLE-BODY, NUCLEAR MAGNETIC RESONANCE SCANNER.

Alfidi RJ, Haaga JR, Yousef SJ, Bryan PJ, Fletcher BD, LiPuma JP, Morrison SC, Kaufman B, Richey JB, Hinshaw WS, Kramer DM, Yeung HN, Cohen AM, Butler HE, Ament AE, Lieberman JM
Dept. Radiology, Sch. Medicine, Case Western Reserve Univ., 2074 Abington Road, Cleveland, OH, 44106
Radiology; 143(1):175-181 1982

In order to determine the clinical usefulness of nuclear magnetic resonance (NMR) imaging, the investigators examined a variety of normal volunteers, patients with neoplastic lesions, and experimental animals. Preliminary results were obtained with the use of potential contrast agents. It was found that imaging applications of NMR in the vascular system, spine, brain, lung, and mediastinum offer certain advantages over other modalities. The absence of biological hazard as well as the ability to obtain unenhanced, noninvasive, gated images of the vascular system, as demonstrated in this study, make NMR particularly attractive. In addition to single-section capability, NMR makes it possible to obtain volume images of the spine and other organs which can be displayed in any desired plane or section thickness. (Author abstract) (11 Refs)

33. A SIMPLE ALGORITHM TO OPTIMIZE MULTIPARAMETRIC SEARCHES IN A NUCLEAR MEDICINE PATIENT DATA FILING SYSTEM.

Salomon JA, Ben Ezra E, Atlan H, Fogelman F, Weisbuch G
Dept. Medical Biophysics and Nuclear Medicine, Hadassah Hosp., Jerusalem, Israel
Comput Biomed Res; 14(6):582-591 1981

An algorithm for multiparametric searches of a clinical nuclear medicine patient database ('CINDERELLA') is described. The hardware is a microprocessor equipped with two high-capacity disks, used as a stand-alone data entry and retrieval system. Since the input/output overhead is the limiting factor in the entire searching process, the algorithm was constructed to minimize the number of disk accesses required to search the database. The algorithm was implemented on the basis of a multiple linked list structure of the database, in order to speed up the system's reply to requests for information on groups of patients, as listed in one or more patient visit record fields (eg, organ, isotopes used, diagnosis, etc). With the use of this algorithm, the stand-alone 'CINDERELLA' system showed a search facility comparable to those of larger, more expensive computer database configurations. Assuming uniform distribution of all search parameters in the database, the theo-

retical evaluation of the duration of the search was a fair estimate of the observed results. Since all fields pertaining to the description of a given patient visit record are available for retrieval through the use of this algorithm, it provides a powerful on-line tool for research or statistical purposes. (7 Refs)

SELECTED PRE-CLINICAL STUDIES

34. THE EFFECT OF CERTAIN VARIABLES ON THE TUMOR AND TISSUE DISTRIBUTION OF TRACERS V: FALSE CARRIER EFFECT, II, FE.

Hagan PL, Halpern SE, Stern PH, Gordon RM, Dabbs JE
Nuclear Medicine Service, Veterans Admin. Medical Center, 3350 La Jolla Village Drive, San Diego, CA, 92161
Invest Radiol; 17(1):53-60 1982

The effect of Fe+++ citrate on carrier-free 67Ga and 59Fe kinetics was studied in a Buffalo rat-Morris 7777 hepatoma model. Two mg Fe+++ citrate/kg was administered intravenously in a variety of time sequences, prior to and following the tracers, and the rats were killed at 4 or 24 hr. 67Ga concentrations could be increased in tumor and decreased in most normal tissues. Administering Fe+++ both one half hr before and 2 hr after the tracers produced 67Ga values equivalent to 72-hr carrier-free values after 4 hr, while simultaneously decreasing gut secretion and increasing urinary excretion. The 59Fe and 67Ga kinetics suggested that events at both vascular and cellular levels were responsible for these changes. This study demonstrated the potential utility of Fe+++ citrate for improving both conventional 67Ga and positron (68Ga) imaging of tumors. (Author abstract) (15 Refs)

35. ALTERATION OF GALLIUM DISTRIBUTION IN THE RAT USING PERIODICALLY RELATED ELEMENTS. ENHANCED EARLY IMAGING.

Triplett JW, Bourne DW, Kin EE, Gautam SR, McWhorter LK, Deland FH
(c/o Kim) Radiology Dept., Univ. Texas Medical Sch., 6431 Fannin, Houston, TX, 77030
Acta Radiol Oncol Radiat Phys Biol; 20(6):365-371 1981

Complexes of carrier-gallium and indium were administered to normal rats and rats with tumors 2 to 6 hr after an injection of carrier-free 67Ga citrate in order to determine their effect on the distribution of 67Ga. Both Ga and In rapidly and significantly decreased the blood activity. Imaging with the same dosage schedule showed decreased activity in soft tissue and viscera, and increased activity in bone, kidney, and bladder. In animals with tumors high doses of carrier-Ga were shown to deplete tumor activity as well as activity in viscera and soft tissues. Moderate doses of carrier-Ga allowed blood and soft tissue clearing with no significant loss of tumor activity. When In citrate was administered to animals with tumors 2 hr after administration of 67Ga, tumor activity continued to increase while soft tissue and visceral activity decreased. Simultaneous injection of In citrate and 67Ga drastically altered the distribution of 67Ga. Two hr after the injection activity was present only in the tumor, kidney, bladder, and bone. This rapid clearance of non-productive Ga brings forth the potential for use of short lived, positron emitting 67Ga coupled with emission tomography. (Author abstract) (25 Refs)

36. UPTAKE AND LOCALIZATION OF SELENIUM-75 IN MAMMARY EPITHELIAL CELL LINES IN VITRO.

Medina D, Lane H, Oborn CJ
Dept. Cell Biology, Baylor Coll. Medicine, Univ. Texas Health Science Center, Houston, TX, 77030
Cancer Lett; 15(3):301-310 1982

Radioactively labeled selenium (75Se) was used to examine the uptake and localization of selenium in the mouse mammary cell lines YN-4, CL-S1, and WAZ-2t. The uptake of 75Se by lines YN-4 and CL-S1 over 48 hr of continuous exposure is shown. The majority of 75Se was incorporated by 24 hr, with an apparent plateau attained by 48 hr. The incorporation was similar in the two lines with an approx double incorporation in line YN-4. The incorporation of 75Se in all three lines after 48 hr continuous exposure is presented. The WAZ-2t cells incorporated a greater amount of 75Se than the other two lines: roughly 3x the amount incorporated by CL-S1. The results indicated that no simple correlation exists between the responsiveness of mammary cell lines to selenium-mediated growth enhancement and the uptake pattern of selenuim by the different cell lines. All three cell lines contained measurable glutathione-peroxidase activity which correlated generally with the extent of total 75Se uptake. Results of cold chase experiments are presented. Cell line YN-4 was exposed to 75Se for 72 hr, and then the medium was replaced with medium containing 'cold' selenium. The amount of 75Se dropped progressively until 43% of the label remained in the cell after 3 days. 75Se was determined in the nuclear, mitochondrial, microsomal, and cytosol fractions. The majority of the 75Se (59%) accumulated in the cytosol, with the mitochondrial and nuclear fractions containing significant amounts. The amount of label recovered in all fractions in the two experiments averaged 87.5%. Results indicate that the stable incorporation of 75Se at high levels should make the cell lines examined useful for further studies on the subcellular localization of selenium into organelles and macromolecules. (30 Refs)

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CANCER DETECTION AND MANAGEMENT

Nuclear Medicine

SERIES CT02 No. 82/09 SEPTEMBER, 1982

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BREAST NEOPLASMS

1. PROSPECTIVE ASSESSMENT ON THE DIAGNOSTIC ACCURACY OF BREAST SCINTISCANNING, MAMMOGRAPHY AND IMMEDIATE CYTOLOGY IN BREAST DISEASE (MEETING ABSTRACT)

Wood RA., Preece PE, Duguid H, Hutchinson F, Wisbey ML, Neill G, Cumming JG, Clark J, Cuschieri A

University Department of Surgery, Ninewells Medical School, Dundee, Scotland

Br J Radiol; 58(11):812 1981

Following a report on the use of 99Tcm diethyline triamine penta acetic acid (DPTA) breast scintiscanning, it became necessary to evaluate prospectively this investigation against other diagnostic aids such as mammography and breast cytology. Patients attending a breast clinic were included in the study and this paper deals with the results obtained in 155 patients (age 17-93 years). Scintigraphic medial and lateral views of both breasts were obtained 1-2h after injection of 8mCi 99TcmDTPA iv, using a gamma camera. Mammography was performed with mediolateral and craniocaudal views. Aspiration cytology of the breast lumps were performed using the Diff Quik staining technique with immediate reporting. The results of the three investigations were reported blind using a scale 0-6. Breast cancer was confirmed histologically in 92 patients, 71 of whom were postmenopausal. When reported blind, mammography and DTPA breast scan have a low diagnostic yield for breast cancer in the premenopausal patients. However, the two tests are complementary in diagnosing breast cancer approaching that of cytology (95-100 per cent). Either test does not exclude breast cancer in the postmenopausal patient. (no Refs)

2. ROLE OF BONE SCINTIGRAPHY IN THE MANAGEMENT OF PATIENTS WITH CARCINOMA OF BREAST.

Krishna BA

Radiation Medicine Center, Bhabha Atomic Res. Center, Tata Memorial Annex, Jerbai Wadia Road, Parel, Bombay 400 012, India

Indian J Cancer; 19(1):47-51 1982

Two hundred and fifteen patients with breast cancer underwent bone scintigraphy using technetium-99m pyrophosphate or technetium-99m HEDP. Scans were obtained in anterior and posterior views and in the extremities in cases of suspected metastases. When comparing bone scans to x-rays, 112 cases showed metastatic spread on bone scans and only 47 cases were detected by x-rays. Occult metastases were detected in 60 patients (56%). Bone scanning also can indicate degree of lymph node involvement which is a reliable prognostic index; 70% of patients with positive node involvement had bone metastases. Post menopausal women showed a higher risk of metastases than premenopausal women. The prognosis of breast cancer is directly related to stage at presentation and early detection of occult and disseminated metastases will help eliminate the gap between apparent (clinical) stage and real (pathological) stage. (12 Refs)

CENTRAL NERVOUS SYSTEM NEOPLASMS

3. BRAIN SCINTIGRAPHY WITH 99MTC-CITRATE AND 99MTC-DTPA: A CLINICAL COMPARISON OF THE RESULTS.

Castagnoli A, Pupi A, Guizzardi G, Ferri P, Taverni N, Meldolesi U, Formiconi A

Servizio di Medicina Nucleare, Arcispedale di Santa Maria Nuova, Viale Morgagni 85, 50134 Firenze, Italy

Eur J Nucl Med; 7(4):184-186 1982

The scintigraphic diagnostic efficacy of 99mTc-citrate (TcC) and 99mTc-DTPA (TcD) for brain lesions was compared in 22 patients. The patients were divided into high or low blood supply groups, each with lesions categorized as ischemia, hematoma, meningioma, astrocytoma, glioma, and metastasis. TcD did not provide any false negative results, and the images' score and regions of interest ratios were significantly better than with TcC. In poorly vascularized lesions and in vascular neoplastic lesions, TcD was superior to TcC. Use of TcD is preferable to TcC for routine brain scintigraphy. (7 Refs)

DIGESTIVE NEOPLASMS

4. COMPARISON OF ULTRASONOGRAPHY, CT AND ISOTOPE SCANNING IN THE DETECTION OF HEPATIC MESTASTASES IN COLORECTAL CARCINOMA (MEETING ABSTRACT)

Finlay IG, Meek D, Mcardle CS

Department of Surgery, Glasgow Royal Infirmary, Glasgow, Scotland

Br J Radiol; 58(11):815 1981

The most effective method to detect liver metastases remains controversial. The aim of the present study was to evaluate the use of: a) ultrasonography, b) CT (computer tomography) and c) isotope scanning in patients undergoing surgery for colorectal carcinoma. Forty-three consecutive patients underwent these investigations at the time of surgery and were followed at 3 monthly intervals for 2 years. Six patients had hepatic metastases detected by the surgeon at laparotomy (overt metastases). A further 10 patients, considered to have a tumor-free liver at surgery, developed proved hepatic metastases (occult metastases) during the follow-up period. Of this latter group, 1, 4 and 8 had been predicted by isotope scan, ultrasonography and CT scan respectively at the time of surgery. These results show that CT scan is superior to ultrasonography which in turn is superior to isotope scanning in the detection of hepatic metastases, and that 25 per cent of patients have occult hepatic metastases at the time of surgery. (no Refs)

5. DETECTION OF GASTROINTESTINAL BLEEDING WITH 99MTC-LABELED RED BLOOD CELLS.

Winzelberg GG, McKusick KA, Froelich JW, Callahan RJ, Strauss HW

Div. Nuclear Medicine, Shadyside Hosp., 5230 Centre Ave., Pittsburgh, PA, 15232

Semin Nucl Med; 12(2):139-146 1982

Using a modified in vivo Tc-99m red cell labeling technique, gastrointestinal (GI) bleeding scintigraphy was performed in 100 patients with GI bleeding. Sixty-two patients with melena or bright red blood per rectum had positive scintiscans. In comparison to results of angiography, endoscopy, surgery and

contrast radiography, radionuclide scintigraphy correctly located the site of bleeding in 83% of patients. The procedure could be performed over a 24 hr period which increased the sensitivity of the test since 85% of the scintiscans were positive at 1 hr or greater after the onset of imaging. The procedure was more sensitive than angiography in detecting sources of GI bleeding. We conclude that GI bleeding scintigraphy 99mTc-red cells is an accurate and effective method to detect upper and lower GI bleeding in patients with acute or intermittent gastrointestinal bleeding. (Author abstract) (13 Refs)

6. SCINTIGRAPHIC EVALUATION OF GASTRIC EMPTYING.

Malmud LS, Fisher RS, Knight LC, Rock E
Dept. Nuclear Medicine, Temple Univ. Hosp., Philadelphia, PA, 19140
Semin Nucl Med; 12(2):116-125 1982

There has been recent, renewed interest in studies of gastric emptying due in part to the introduction of new therapies for peptic ulcer disease and attempts to better understand gastric physiology. Of the methods available for studying gastric emptying patterns, nuclear medicine techniques are optimal due to their noninvasive character, reproducibility and quantitative ability. The modulation of gastric emptying is multifactorial, and includes motor control, electrical activity, hormonal influences, and the composition of the meal itself: liquid vs solid; protein, carbohydrate and fat content; fiber or particle size; osmolality; pH; and pharmacologic agents. Because of the ease of performing gastric emptying studies using radiolabeled physiologic meals, these tests are being employed with increasing frequency in the evaluation of patients with disorders such as diabetic gastroparesis, postgastrectomy gastroparesis or dumping syndrome, and in the study of normal gastric physiology in man. Present data suggests that combined liquid-solid, dual radionuclide studies afford the greatest information regarding simultaneous gastric emptying patterns of liquid and solid components of a meal, and that single radionuclide, solid tests of gastric emptying are the more sensitive technique for determining subtle abnormalities of gastric emptying, when only a single tracer is employed. (Author abstract) (45 Refs)

7. THE ROLE OF RADIONUCLIDE STUDIES IN PEDIATRIC GASTROINTESTINAL DISORDERS.

Sty JR, Starshak RJ
Milwaukee Children's Hosp., P.O. Box 1997, 1700 W. Wisconsin Ave., Milwaukee, WI, 53201
Semin Nucl Med; 12(2):156-172 1982

Radionuclide techniques are currently used to fully evaluate many congenital and acquired abnormalities of the gastrointestinal tract of children. Frequently, the anatomic and functional data provided by the nuclear examination are definitive. In the study of many disease entities, tracer techniques have replaced more cumbersome or invasive procedures. Although the radiopharmaceuticals and instrumentation are similar as applied to both children and adults, the uniqueness of children and their disease entities requires special consideration when performing and interpreting their studies. In this review, the principle radionuclide examinations used in the evaluation of pediatric gastrointestinal disorders are detailed and examples are illustrated. (Author abstract) (76 Refs)

ENDOCRINE NEOPLASMS

8. COMPUTERIZED STUDY WITH 201TL OF THE COLD THYROID NODE.

Palermo F, Saitta B, Coghetto F, Tiberio M, Caldato L
Ospedale Generale Regionale, Treviso, Italy
Nuklearmedizin; 21(1):23-29 1982

Scanning with 201Tl-chloride was used to evaluate 293 patients with non-functioning thyroid areas previously detected with 131I or 99mTc scanning. Of the 293 nodules, 22 were histologically malignant; all 22 showed 201Tl uptake. Of 259 patients with benign solid nodules, 74 showed definite and 7 questionable uptake; among the 12 patients with thyroiditis, 5 had definite and 3 questionable uptake. In 120 consecutive patients, clinico-histological and radioisotopic diagnosis agreed in all but three of the colloid-cystic type nodes, two of which showed doubtful 201Tl uptake. Histological findings and 201Tl diagnoses agreed in 16 malignant and 23 benign solid neoformations; only two additional cases in the latter group were equivocal. No 201Tl false negative findings were reported in patients with proven malignancy; one minimal sclerosing carcinoma was singled out by the analysis of activity/time curves, while the static image of 201Tl was almost identical to that of 99mTc. No statistically significant differences were observed between solid benign and malignant lesions in the density-index and the accumulation coefficient. Dynamic behavior of 201Tl in benign nodules paralleled that in normal thyroid tissue. The index of nodular disappearance was significantly different in malignant and solid benign growths. (12 Refs)

9. SCINTIGRAPHIC STUDIES IN PATIENTS WITH MEDULLARY CARCINOMA OF THE THYROID.

Rasmusson B
Onkologisk afd., Herlev Hosp., DK-2730 Copenhagen, Denmark
Eur J Nucl Med; 7(4):150-151 1982

Preoperative thyroid scintiscans were performed in 29 patients with medullary carcinoma (MC) of the thyroid and the results were compared with findings from palpation and pathological examination. Findings were also compared with 111 preoperative scintiscans obtained from patients with papillary (PC), anaplastic (AC), or follicular (FC) carcinomas. Isotopes used included 99mTc, 131I, and 67Ga. Cold areas corresponding to palpable MC tumors were observed in 15/29 thyroid scintiscans. Of 10 patients with normal scintiscans, 6 had palpable tumors measuring 1.5-8 cm in diameter and 4 had tumors that were either not palpable or were not apparent in the removed gland. In most groups of thyroid carcinomas, cold tumors were seen. Atypical uptake was observed in 16% of tumors. Normal uptake in palpable tumors was very high in MC compared with other thyroid tumors. Of 62 PC, 39 tumors were cold a 10 had abnormal uptake. Of 32 AC patients, 29 had cold nodules and 3 had abnormal uptake. Of 17 FC patients, 11 had cold nodules and 5 abnormal uptake. Gallium scintiscans were performed in nine patients; six had extensive tumors, but 67Ga accumulation was observed in only one. These results demonstrated that, except for MC, only 0-6% of palpable tumors greater than 2 cm in diameter had normal scintiscans; 19% of MC had normal scintiscans. Thus, 67Ga scintiscan has limited application in diagnosis of MC of the thyroid. (11 Refs)

10. RELATIONSHIP BETWEEN NUCLEAR FEULGEN-DNA CONTENT AND 67GA UPTAKE IN PATIENTS WITH MALIGNANT THYROID TUMORS.

Higashi T, Watanabe Y, Yamaguchi M, Hisada T, Mimura T, Ito K
Dept. Radiology, Kanagawa Dental Coll., 82 Inaoka-cho, Yokosuka-shi 238, Japan
Radioisotopes; 31(1):42-43 1982

In an attempt to improve differential diagnosis of anaplastic carcinoma, malignant lymphoma, and papillary adenocarcinoma of the thyroid, 67Ga scans were performed preoperatively in 16 patients with thyroid tumors (4 anaplastic carcinoma, 5 malignant lymphoma, 4 papillary adenocarcinoma, 3 cystic adenocarcinoma). Results of the 67Ga scans were analyzed with respect to DNA histograms of the resected tumor tissues stained with Feulgen. The av DNA contents of the anaplastic carcinoma [325.9 AU (correlation units)] and of malignant lymphoma (333.5 AU) tissues were markedly higher than those of the papillary adenocarcinoma (220.1 AU) and of cystic adenocarcinoma (243.9 AU) Tumor cell proliferation, indicated by DNA content, was correlated with 67Ga uptake of the tumor cells. (9 Refs) (In JPN)

11. CORRELATION OF THYROIDITIS AND ANTI-THYROGLOBULIN ANTIBODIES (RIA) IN SERUM WITH THE INCIDENCE OF METASTASIS BY 131-I SCANS IN DIFFERENTIATED THYROID CARCINOMAS (MEETING ABSTRACT)

Echenique RL, Ibanez ML
M. D. Anderson Hospital and Tumor Institute, Houston, TX, 77030
Proc Am Soc Clin Oncol; 1:C-132 1982

Fifty patients, in a post-therapy follow up for differentiated nonmedullary thyroid carcinoma, were studied comparing the incidence of distant metastasis by 131-I scan with the detectability of thyroglobulin antibodies (hTg-AB) (RIA) in serum, at the time of the study, and with the retrospect association of thyroiditis to the primary thyroid tumor, at the initial thyroid surgical specimen, post-thyroidectomy. In the group of 34 patients with nondetectable hTg-Ab and without thyroiditis, the incidence of distant metastasis occurred in 24% of the cases (including one case with a false negative 131-I scan), in contrast with the group of 16 cases with associated thyroiditis where the incidence of distant metastasis was 6%; in none of the 7 cases with the finding of detectable hTg-Ab has distant metastasis occurred so far. This study suggests that the association of differentiated thyroid carcinoma with thyroiditis may protect the host from the occurrence of distant metastasis. Therefore, a positive hTg-Ab (RIA) in serum may predict a better prognosis. These results may justify to employ the use of preventive immunological maneuvers, as adjuvant immunotherapy, at the initial diagnosis, in those patients with differentiated thyroid carcinoma and at high risk of distant metastasis and poor prognosis. (no Refs)

12. NUCLEAR MEDICINE OF THE THYROID.

Kinoshita F
Tokyo Metropolitan Ohkubo Hosp., 2-44-1 Kabuki-cho, Shinjuku-ku, Tokyo 160, Japan
Radioisotopes; 31(1):44-54 1982

Diagnosis and treatment of thyroid diseases were discussed. Diagnosis of thyroid diseases involves the determination of the radioisotopic absorption rates of the thyroid. In this process, selection of the appropriate radioisotope (RI), pretreatment methodology, method of administering the RI and of measuring the RI absorption rates must be considered. In the case of thyroid scintigrams, 201TlCl has been used to image cancer of the thyroid gland. However, while high accumulation of the RI is observed in cases of papillary or filter cell adenocarcinoma of the thyroid, 50-70% of the cases of benign tumors also show positive findings, thus making differential diagnosis difficult. Even so, 201TlCl was thought to be the best RI for imaging papillary or filter cell adenocarcinoma, 123I or 131I are the best for investigating metastatic thyroid cancer, and 67Ga-citrate is the best for diagnosing anaplastic carcinoma and malignant lymphoma of the thyroid. 131I (100 milliCi units) has been used to treat thyroid cancer, particularly metastatic cancer, but management of the excreted RI has limited its effectiveness. The possibility of complications such as leukemia, thyroid cancer, and cancer of other organs, necessitates the use of RI. Studies of 484 children treated with 131I have not shown increased incidence of genetic anomalies. (2 Refs) (In JPN)

HEAD AND NECK NEOPLASMS

13. ACINIC CELL CARCINOMA OF THE SUBLINGUAL GLAND. SCINTIGRAPHY IN PRE-OPERATIVE EVALUATIONS.

van den Akker HP, Busemann-Sokole E, Becker AE
Dept. Oral and Maxillofacial Surgery, Univ. Amsterdam, Wilhelmina Gasthuis, le Helmersstraat 104, 1054 EG Amsterdam, The Netherlands
Int J Oral Surg; 10(5):363-366 1981

A 53-yr-old female presented with a swelling in the right side of the floor of the mouth, of more than 35 yr duration. The diagnosis of a well-vascularized tumor was made after iv injection of 99mTc-pertechnetate using dynamic scintigraphy. The patient remained free of recurrence 6 yr post-surgery. A fast dynamic scintigraphic study can differentiate between a well-vascularized mass and a cystic lesion in the sublingual area. (8 Refs)

14. INCREASED JAW RADIOACTIVITY ON BONE IMAGING.

d'Avignon MB, Baum S
(c/o Baum) Div. Nuclear Medicine, Milton S. Hershey Medical Center, 500 University Drive, Hershey, PA, 17033
Semin Nucl Med; 12(2):219 1982

Causes of uniform or focal areas of increased jaw radioactivity during skeletal imaging are listed. Common causes of uniformly increased jaw radioactivity are inflammation of edentulous ridges, free pertechnetate adhering to dentures, and acute gingival disease; uncommon causes are fibrous dysplasia, Paget's disease, and chronic osteomyelitis. Rare causes are radiation osteitis, infantile cortical hyperostosis, and hyperparathyroidism. Common causes of focal areas of increased jaw radioactivity include dental surgery, fracture, malignancy, and impaction; uncommon (ossifying fibroma, odontoma, and residual osteitis) and rare (ostemyelitis, enchondroma, osteoma, actinomycosis, and lymphoma) also are listed. (10 Refs)

HEMATOLOGIC, RETICULOENDOTHELIAL, AND LYMPHATIC NEOPLASMS

15. CLINICAL EVALUATION OF LYMPHOSCINTIGRAPHY USING 99MTC-RHENIUM COLLOID: A COMPARISON WITH LYMPHOGRAPHY.

Ohnishi R, Nishiyama S, Nabeshima K, Suematsu T, Matsuo M, Yoshida Y, Kida T, Fukukawa T, Inoue Y, Sakamoto T, Yoshimoto S
Dept. Radiology, Kobe Univ. Sch. Medicine, Kusunoki-cho, 7-chome, Chuo-ku, Kobe-shi 650, Japan
Radioisotopes; 30(7):397-400 1981

The newly developed lymphoscintigraphic agent 99mTc-rhenium colloid was used in 22 cases (10 malignant lymphoma, 2 lymphedema, 8 malignant tumor in uro-reproductive system, and 2 other diseases). Lymphography was also used in 12 of the 22 patients. The agent was injected sc between the first and second toes in a dose of 1-2 mCi. Lymphoscintigraphy was performed 1.5-2.5 hr after the injection. Uptake was seen in 22/22 in inguinal lymph node, 21/22 in pelvic lymph node, 20/22 in lumbar lymph node, 18/22 in liver, and 22/22 in kidney. Findings in cases of lymphedema were satisfactory and consistent with findings using lymphography. The lymphatic pathway was clearly shown. Thus, lymphoscintigraphy is useful for detecting lymphedema but not metastases, except in cases of extensive metastasis. (5 Refs) (In JPN)

MUSCULOSKELETAL NEOPLASMS

16. BONE SCINTIGRAPHY WITH 99M TC-HYDROXY METHYLENE DIPHOSPHONATE (99M TC-HMDP).

Okahashi S, Ishimaru T, Maeda H, Sakata T, Yamasaki K, Akagi H
Dept. Radiology, Osaka Medical Sch., 2-7, Daigaku-cho, Takatsuki-shi, Osaka 569, Japan
Radioisotopes; 30(8):458-460 1981

Bone scintigraphy with 99m Tc-hydroxy-methylene diphosphonate (HMDP) was used in 60 patients. Eleven excellent, 46 good, and 3 fair images were obtained. In 20 patients, both 99m Tc-HMDP and 99m Tc-methylene diphosphonate scintigraphy were applied and no difference in disease detecting ability was noted. The clearance of 99m Tc-HMDP from blood was rapid and no side effects were observed. When 99m Tc-HMDP is used, scintigrams can be taken 90 min after administration. (6 Refs) (In JPN)

17. CLINICAL EVALUATION OF BONE SCINTIGRAPHY WITH 99MTC-HMDP.

Ishii C, Mori Y, Hata Y, Katsuyama N, Fujioka M, Fukazawa W, Hashimoto H, Horiuchi T, Fujioka M, Kawakami K
Dept. Radiology, Jikei Univ. Sch. Medicine, 3-24-8 Nishi-shinbashi, Minatoku, Tokyo 105, Japan
Radioisotopes; 30(7):401-403 1981

Scintigrams taken in 37 patients (1-79 yr old; 10 with breast cancer, 2 lung cancer, 3 prostate cancer, 2 uterine cancer, 20 others) with 99mTc-hydroxymethylene diphosphonate (99mTc-HMDP) and with 99mTc-methylene diphosphonate (99mTc-MDP) showed little differences. Scintigrams taken at 2.5 hr after 99mTc-HMDP administration were clearer than those taken at 1 hr. Accumulation of the two agents in the bone was similar. Clearance of radioactivity from blood, however, was faster with 99mTc-HMDP. Thus, the use of 99mTc-HMDP may shorten the time between the administration of the agent and the taking of scintigram. (5 Refs) (In JPN)

18. QUALITY CONTROL WITH THE CAMERA COMPUTER IN BONE SCINTIGRAPHY.

Hegermann R, Endert G, Kleinert P, Ritter E-P, Schumann E
Radiologische Klinik und Poliklinik, Medizinische Akademie Erfurt, Nordhauser Strasse 74, DDR - 5060 Erfurt, E. Germany
Radiobiol Radiother (Berl); 23(1):65-69 1982

Bone scintigraphy (SC) was performed in 113 patients (13-75 yr old) 2-4 hr after they were injected with 99mTc-diphosphonate. Results were evaluated subjectively and objectively with the aid of regions of interest technique of a camera computer. Concentration quotient (CQ) between lumbar vertebra and surrounding soft tissue was determined. SC results were evaluated, and CQ was considered good for the following data: 2-3.99 in 4, 4-7.99 in 14, 8-9.99 in 3, and greater than 10 in 1 patient. (9 Refs) (In GER)

RESPIRATORY AND CARDIOVASCULAR NEOPLASMS

19. USEFULNESS OUTCOME IN EVALUATING THE UTILITY OF NUCLEAR SCANS OF THE BONE, BRAIN, AND LIVER IN BRONCHOGENIC CARCINOMA PATIENTS.

White DM, McMahon LJ, Denny WF
(c/o Denny) Dept. Internal Medicine 111, Tucson V.A.M.C., Tucson, AZ, 85723
Am J Med Sci; 283(3):114-118 1982

In this study we employed the concept of the outcome audit to assess the 'benefit' (in contrast to the number of positive readings) derived from 81 bone, 45 brain, and 47 liver scans, performed on 59 bronchogenic carcinoma patients. Benefit was rigorously defined and based on any outcome instrumental in the subsequent management of the patient. Clinically indicated scans were frequently found to be of benefit, while those without indications were not (88.0% vs 12.5%). Negative scans were as useful as positive scans if clinically indicated (14.0% vs 9.6%). Histology did not influence the likelihood of benefit. We conclude that scans obtained to evaluate a clinical abnormality are likely to be useful whether positive or negative while scans ordered without specific clinical indications are unlikely to be of management benefit. (Author abstract) (11 Refs)

20. THE VALUE OF THE PERFUSION SCINTIGRAM OF THE LUNG FOR 'T AND N STAGING' IN BRONCHOGENIC CARCINOMA.

Konietzko N, Diedrichs H, Greschuchna D
Ruhrlandklinik, D-4300 Essen 16, W. Germany
Prax Klin Pneumol; 35(4):178-181 1981

The value of perfusion scintigraphy (PS) for assessing the extent of primary tumor growth and lymph node involvement (T and N staging) was studied in 148 patients with histologically confirmed bronchogenic carcinoma. Av patient age was 57 +-8 yr; 84% of patients were men. Tumors were located centrally in 61% and on the right side in 525 of patients. Histological types included squamous-cell carcinoma (47%), adenocarcinoma (18%), small-cell carcinoma (17%), giant-cell carcinoma (9%), alveolar carcinoma (2%), and undifferentiated (7%). PS was performed using 3mCi of a 99mTC compound with blockade of the thyroid. Mediastinoscopy was performed on all patients. Curative resection was not attempted in 36 pa-

tients who were diagnosed as prognostically inoperable. Thoracotomy was performed on 112 patients. Surgery included segmental resection, lobectomy, bilobectomy, pneumonectomy, or extended pneumonectomy. Operative findings showed that blood circulation in the affected lung, as indicated by PS, was progressively reduced as tumor growth progressed; wide variations in values were found, however. Lymph node involvement had no influence on circulation; decreased circulation was related to T staging but not to N staging. PS findings did not permit precise prediction of the extent of required surgery. Reduction of perfusion to less than 30% of normal values generally indicated that pneumonectomy was required. Values below 10% were indicative of inoperability. (10 Refs) (In GER)

21. MATHEMATICAL ANALYSIS OF PULMONARY PERFUSION SCINTIGRAPHY FOR EVALUATION OF RIGHT-HEART KINETICS IN OBSTRUCTION OF PULMONARY BLOOD FLOW.

Schreiber D, Henning A, Schmidt G

Abteilung fur Nuklearmedizin und Strahlentherapie, Alfried Krupp von Bohlen und Halbach Krankenhaus, Akademisches Lehrkrankenhaus des Universitatsklinikum Essen, Alfried-Krupp-Str. 21, D-4300 Essen 1, W. Germany

Nuklearmedizin; 21(1):19-22 1982

Serial scintigraphy with pulmonary perfusion of a 99mTc compound was performed on 30 patients with bronchogenic carcinoma (BC) and 30 patients without cardiac or pulmonary disease. Right heart kinetics were analyzed using a special mathematical model to calculate a right-heart load factor. The factor was 0.86 with a standard deviation of 0.09 for patients with BC and 0.57 with a standard deviation of 0.06 for controls. (no Refs) (In GER)

MISCELLANEOUS

22. DETECTION OF ABDOMINAL ABSCESSES WITH GALLIUM-67 CITRATE: CORRELATIVE STUDIES WITH COMPUTED TOMOGRAPHY.

Muroff LR

Univ. South Florida, Coll. Medicine, Tampa, FL, 33620

Semin Nucl Med; 12(2):173-183 1982

Undiagnosed abdominal abscess is a medical problem of substantial clinical importance. The high morbidity and mortality associated with this entity demand prompt, accurate diagnosis. The combined use of gallium scintigraphy and computed tomography provides the imaging tools necessary to accomplish this goal. If the suspected pathology cannot be localized, gallium scintigraphy is the initial diagnostic imaging procedure utilized. When antecedent events or clinical symptoms suggest a specific site for the suspected inflammatory collection, computed tomography (CT) is used to evaluate the area. The strengths and weaknesses of gallium scanning and computed tomography are explored in depth, and particular emphasis is given to proper technique and the avoidance of pitfalls. A logical approach to the use of these modalities in tandem is presented. (Author abstract) (28 Refs)

23. TECHNETIUM SCANNING IN KAPOSI'S SARCOMA AND ITS SIMULATORS.

Gunnoe R, Kalivas J

(c/o Kalivas) Div. Dermatology, Kansas Univ. Medical Center, Kansas City, KS, 66103

J Am Acad Dermatol; 6(4,part1):463-469 1982

The clinical and often the histologic features of Kaposi's sarcoma, pseudo-Kaposi's sarcoma (acroangiodermatitis of Favre-Chaix), and livedoid vasculitis (atrophie blanche) may be confused with each other, as shown by observations in six patients. However, 99mTc scans were partially helpful in distinguishing these diseases. Positive scans were obtained in an 89-yr-old woman with Kaposi's sarcoma, and three patients (18-32 yr old) with pseudo-Kaposi's sarcoma (1/3 also had hypernephroma), but negative in two patients (20-38 yr old) with atrophie blanche. (11 Refs)

SELECTED PRE-CLINICAL STUDIES

24. IN VIVO DISTRIBUTION OF CARRIER PROTEIN/67GA-COMPLEXES.

Anghileri LJ, Ottaviani M 05, Raynaud C

Dept. Nuclear Medicine, Univ. Nancy, 18, rue Lionnois, F-54000 Nancy, France

Nuklearmedizin; 21(1):8-11 1982

The influence of exogenous labeled lactoferrin and transferrin on the uptake of 67Ga by DS sarcomas and inflammatory lesions was studied in male Wistar rats. Independent of which 67Ga-compound was used, the radioactivity uptake was usually higher in tumor- and inflammatory lesion-bearing rats than in normal controls. In most tissues, lesion-bearing rats accumulated more 67Ga-chloride, lactoferrin-chloride, and lactoferrin-citrate complexes than tumor-bearing animals. Lactoferrin and transferrin-citrate complexes were taken up to the highest extent by tumor tissues but the values showed high individual variations. (12 Refs)

25. DETERMINATION OF GALLIUM IN TUMOUR-AFFECTED TISSUES BY MEANS OF SPECTROSCOPIC TECHNIQUES: A COMPARATIVE STUDY.

Caroli S, Alimonti A, Delle Femmine P, Shukla SE

Laboratori di Tossicologia, Istituto Superiore di Sanita, Viale Regina Elena 299, 00161 Rome, Italy

Anal Chim Acta; 136:225-231 1982

A comparative investigation was carried out on the suitability of atomic absorption spectrometry and of emission spectrography with arc and hollow-cathode excitation sources for determination of gallium (ug g-1) in biological samples. The three methods give reliable results. Hollow-cathode emission spectrography was found to be influenced to a lesser extent by matrix effects and to be more precise than the other two techniques. (Author abstract) (9 Refs)

26. THE INFLUENCE OF IRON ON 67GA DISTRIBUTION IN TUMOR-BEARING MICE: EFFECT OF IRON ADMINISTERED AFTER 67GA INJECTION.

Higashi T, Shimura A, Wakao H
Dept. Radiology, Kanagawa Dental Coll., 82, Inaoka-cho, Yokosuka-Shi, 238, Japan
Radioisotopes; 30(7):385-390 1981

The effect of hyperferremia on uptake, distribution, and metabolism of 67Ga in Ehrlich's ascites tumor-bearing mice and VX2 tumor-bearing rabbits was investigated. The uptake of 67Ga into tumors of tumor-bearing mice was the highest (4.97 +-0.96%/g) at 12 hr after 67Ga injection, and decreased to about one half (2.28 +-0.68%/g) at 96 hr. The ratio of 67Ga in tumor to that in blood (T/B) increased with time (0.41 +- 0.09 at 6 hr and 9.88 +-4.3 at 120 hr), however, suggesting a more rapid clearance of 67Ga from blood than from tumor. Injection of Fesin (saccharated ferric oxide) to raise the serum iron in mice already given 67Ga had little effect on 67Ga distribution in tumor and other organs, but increased the ratio T/B (7.78 +-2.6 at 3 hr to 27.5 +-7.18 at 24 hr), suggesting that clearance of 67Ga from blood was accelerated by Fesin injection. When scintigraphic images were taken from 67Ga-injected tumor-bearing rabbits, tumor images with greater contrast were obtained from the Fesin-injected group. These results suggest an effective method of improving tumor images. (11 Refs) (In JPN)

27. THE INFLUENCE OF IRON ON 67GA DISTRIBUTION IN TUMOR-BEARING MICE: EFFECT OF IRON ADMINISTERED BEFORE 67GA INJECTION.

Shimura A, Higashi T, Wakao H
Dept. Radiology, Kanagawa Dental Coll., 82, Inaoka-cho, Yokosuka-shi, 238, Japan
Radioisotopes; 30(7):379-384 1981

The concentration of serum iron (SI) was artificially raised by injecting Fesin (saccharated ferric oxide) into Ehrlich's ascites tumor-bearing mice. At a high SI value, 67Ga was injected and the intake and distribution of 67Ga in the tumor and other organs were determined. When 67Ga was injected into the tumor-bearing mice 3 hr after administering Fesin [when SI was at the highest (1527.5 +-49.1 ug/deciliter) and unsaturated iron-binding capacity was at the lowest (-986.5 +-97.6 ug/deciliter)] the uptake of 67Ga into the tumor, liver, kidney, spleen, and salivary gland was lower than that of control. Only the uptake of 67Ga into the bone in the Fesin-injected group was slightly higher than that in control mice. These differences were significant only for the liver and spleen when 67 Ga was injected 24 hr after injection of Fesin. Similarly, whole-body 67Ga activity was reduced in Fesin-injected mice compared with that in controls. These results suggest rapid excretion of 67Ga in Fesin-injected mice. Consistent with this, the amount of 67Ga excreted in urine was much greater in the Fesin-injected group than in the control group. (9 Refs) (In JPN)

28. THE INFLUENCE OF WHOLE BODY 60CO-IRRADIATION ON DISTRIBUTION OF 67GA IN TUMOR-BEARING MICE.

Wakao H, Shimura A, Higashi T
Dept. Radiology, Kanagawa Dental Coll., 82, Inaoka-cho, Yokosuka-shi, Kanagawa Pref. 238, Japan
Radioisotopes; 30(8):431-436 1981

Ehrlich ascites tumor-bearing mice were irradiated with 60Co at a dose of 1,000 rad. Serum iron (SI) was lowest [(232.0 +-52.8 ug/deciliter (dl) compared to 385.4 +-45.3 ug/dl for controls)] 3 hr after irradiation and then gradually increased, reaching the highest level (441.1 +-72.3 ug/dl) 48 hr after irradiation. Three hr after irradiation when SI was lowest, 67Ga was injected into the mice and uptake and distribution of 67Ga were measured 24 hr later. The uptake of 67Ga into tumor, liver, kidney, spleen, salivary gland, and femur was slightly higher (2.81 +-0.80 %/g for tumor) in the irradiated mice than in controls. Unexpectedly, SI was higher (401.7 +-73.4 ug/dl) in the irradiated group than in controls (249.7 +-45.3 ug/dl). However, unsaturated iron binding capacity was higher (256.0 +-72.7 ug/dl) in the irradiated group than in controls (219.5 +-46.9 ug/dl). When 67Ga was injected 24 hr after irradiation, the uptake of 67Ga was lower in the irradiation group than in controls. When the amount of 67Ga in excretions was measured, the irradiated group was shown to excrete consistently more 67Ga in urine than in feces, whereas the control group always excreted more 67Ga in feces than in urine. These results suggest a great influence of SI on metabolism of 67Ga. (11 Refs) (In JPN)

29. E-17ALPHA-[125I]IODOVINYLESTRADIOL: AN ESTROGEN-RECEPTOR-SEEKING RADIOPHARMACEUTICAL.

Hanson RN, Seitz DE, Botarro JC
Dept. Medicinal Chemistry, Coll. Pharmacy and Allied Health Professions, Northeastern Univ., Boston, MA, 02115
J Nucl Med; 23(5):431-436 1982

Through the use of radioiododestannylation, the specifically labeled E-17alpha-[125I]iodovinylestradiol [(I-125)VE2] was synthesized rapidly and in high yield from the stable precursor E-17alpha-tributylstannylvinylestradiol (SnVE2), and its biodistribution was determined in immature female rats. The agent accumulated in the uterus, achieving a peak uptake of 0.465% ID-kg/g at 2 hr. Uterus-to-blood ratios of 19 and 16 occurred at 1 and 2 hr, respectively, declining to 7 by 4 hr after injection. The uptake of (I-125)VE2 by the uterus at 2 hr was reduced 58-65% by pretreatment of the immature rats with estradiol (5 ug) or tamoxifen (100 ug), and compared with 16alpha[125I]iodoestradiol, (I-125)VE2 showed greater uterine uptake and similar uterus-to-blood ratios. The ease of preparation of the radioligand represents an advantage over the synthetic procedures for other estrogen-receptor-seeking agents. (Author abstract) (26 Refs)

30. 16ALPHA-[77BR]BROMOESTRADIOL: DOSIMETRY AND PRELIMINARY CLINICAL STUDIES.

McElvany KD, Katzenellenbogen JA, Shafer KE, Siegel BA, Senderoff SG, Welch MJ, Los Alamos Medical Radioisotope Group
Mallinckrodt Inst. Radiology, Washington Univ. Sch. Medicine, 510 South Kingshighway, St. Louis, MO, 63110
J Nucl Med; 23(5):425-430 1982

An estrogen-receptor-binding radiopharmaceutical, 16alpha-[77Br]bromoestradiol-17beta, has been used successfully at high specific activity to image carcinogen-induced mammary tumors in rats and in preliminary studies to image breast tumors in patients. The biodistribution of the labeled estrogen in rats and its clearance in a monkey were used to estimate the radiation absorbed doses to a human resulting from administration of the radiopharmaceutical. Preliminary imaging studies in patients with mammary carcinoma show promising results and warrant further development of radiolabeled estrogens, particularly those carrying positron emitters that could permit positron emission tomography - for example Br-75 or F-18. (Author abstract) (23 Refs)

31. IN VIVO COMPARISON OF 16ALPHA[77BR]BROMOESTRADIOL-17BETA AND 16ALPHA-[125I]IODOESTRADIOL-17BETA.

McElvany KD, Carlson KE, Welch MJ, Senderoff SG, Katzenellenbogen JA, Los Alamos Medical Radioisotope Group
Mallinckrodt Inst. Radiology, Washington Univ. Sch. Medicine, 510 South Kingshighway, St. Louis, MO, 63110
J Nucl Med; 23(5):420-424 1982

An in vivo comparison of two estrogen-receptor-binding radiopharmaceuticals of high specific activity, 16alpha-[77Br]bromoestradiol-17beta and 16alpha-[125I]iodoestradiol-17beta, has been carried out in immature female rats. The iodoestradiol has slightly higher uterine uptake at 1 hr after injection, whereas the brominated analog has significantly enhanced uptake at later times. The similar behavior of the two compounds in vivo suggests that estradiol labeled with I-123, Br-77, or Br-75 could be used interchangeably for the imaging of breast tumors containing estrogen receptors. In addition, coinjection 16alpha-[125I]iodoestradiol as an internal standard has been shown to be useful for comparison of different radiohalogenated estrogens. (Author abstract) (17 Refs)

32. METABOLIC AND DISTRIBUTION STUDIES WITH RADIOLABELED 5-FLUOROURACIL.

Young D, Vine E, Ghanbarpour A, Shani J, Siemsen JK, Wolf W
(c/o Wolf) Radiopharmacy Program, Sch. Pharmacy, Univ. Southern California, Los Angeles, CA, 90033
Nuklearmedizin; 21(1):1-7 1982

Possible variations in distribution, metabolism, and elimination of 5-fluorouracil (5-FU) that may affect actual 5-FU availability at the target site were examined in six cancer patients with colorectal, liver, or breast neoplasia and in tumor-bearing male Fischer rats. 5-FU was labeled with a short-lived radionuclide and metabolites analyzed. Results of chromatographic studies are reported. The diversity of 5-FU metabolism in cancer patients may indicate the use of 18F-5-FU as a probe for understanding individual variability in the clinical situation. (17 Refs)

33. IN VIVO REGIONAL QUANTITATION OF INTRATHORACIC TC-99M USING SPECT: CONCISE COMMUNICATION.

Osborne D, Jaszczak R, Coleman RE, Greer K, Lischko M
Dept. Radiology, Duke Univ. Medical Center, Box 3808, Durham, NC, 27710
J Nucl Med; 23(5):446-450 1982

A whole-body single-photon emission computed tomographic system (SPECT) was used to quantitate the activities of a series of Tc-99m point sources in the dog's thorax and to evaluate attenuation of a uniform esophageal line source containing a known concentration of Tc-99m. A first-order attenuation correction and an empirically derived attenuation coefficient of 0.09 cm-1 were used in the SPECT analyses of the intrathoracic point sources. The relationship between SPECT measurements of multiple point-source activities and the same sources measured in air was linear over a range of 100 to 1,000 uCi (slope 1.08; R2 coefficient of determination 0.97). These data are sufficiently accurate to allow an estimate of the regional activity of radiopharmaceutical in the dog's thorax and justify their use in experimental quantitation of regional pulmonary perfusion. (Author abstract) (10 Refs)

REVIEWS

34. DRUG-INDUCED CHANGES IN THE BIOLOGIC DISTRIBUTION OF RADIOPHARMACEUTICALS.

Hladik WB, Nigg KK, Rhodes BA
Coll. Pharmacy, Univ. New Mexico, Albuquerque, NM, 87131
Semin Nucl Med; 12(2):184-218 1982

Many pharmacologic agents modify the expected distribution of radiopharmaceuticals. The authors have attempted to synthesize the literature to date relating to drug-radiopharmaceutical interaction. Further, these interactions were classified as to their (1) 'desirability' (undesirable vs intentional) and to the (2) specific 'mechanism of action.' Items in the tables are individually referenced to allow the reader easy access to source material. (Author abstract) (302 Refs)

35. PHYSICAL BASIS OF NUCLEAR MAGNETIC RESONANCE IMAGING.

Crooks LE, Kaufman L, Davis P, Tosteson H
Radiologic Imaging Lab., Univ. California, San Francisco, CA
IEEE Trans Nucl Sci; 29(3):1252-1257 1982

Nuclear magnetic resonance imaging experiments with rats revealed a wide range of magnetic relaxation times (MRT) for tumors which overlap MRT values of normal and other abnormal tissues. It remains to be answered whether these MRT values are specific for different broad categories of tumor types or for different stages of tumor development. The reason for the wide range of MRT values for tumors is unknown. (21 Refs)

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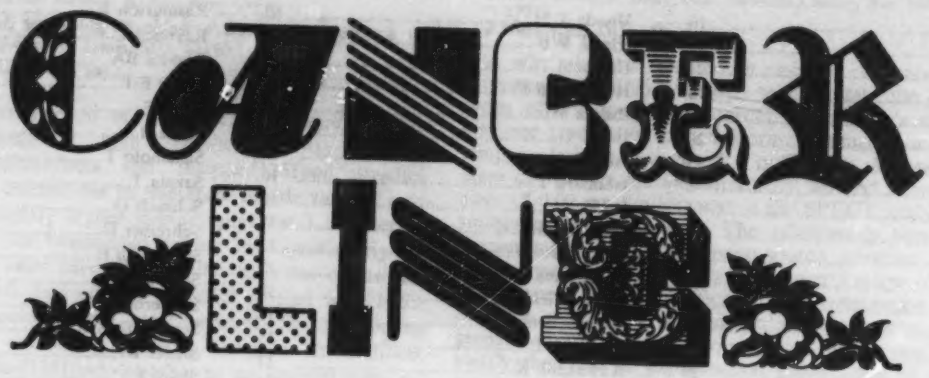

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BREAST NEOPLASMS

1. INTERNAL MAMMARY LYMPHOSCINTIGRAPHY IN BREAST CARCINOMA: POSSIBLE SIGNIFICANCE IN RELATION TO CURRENT TREATMENT.

Manji MF
Cancer Control Agency British Columbia, 2656 Heather St., Vancouver, B.C., V5Z 3J3, Canada
J Can Assoc Radiol; 33(1):10-14 1982

A diagnostic modality to study parasternal lymph nodes was examined at the Cancer Control Agency of British Columbia, Vancouver. Forty-five patients with carcinoma of the breast were studied. The data correlate well with that from other centers in regard to anatomic validity, lymph node distribution, cross drainage and findings in relation to the stage of disease. The frequency of lymphoscintigraphic abnormalities was almost twice as high in relation to lesions situated in the center and inner half of the breast as compared with outer half lesions. Twenty-eight percent of patients demonstrated cross drainage between parasternal lymphatics. In 11% of the patients, nodes were situated at locations greater than 4 cm from the midline. Work is in progress to study the correlation of

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lymphoscintigraphy with disease in the nodes. The data indicate that this study can be used in other centers in the management of patients with mammary carcinoma. (Author abstract) (16 Refs)

2. GALLIUM-67 UPTAKE IN CYSTOSARCOMA PHYLLODES.

Silver MR
Dept. Radiology, Presbyterian-Univ. Hosp., Univ. Pittsburgh, Pittsburgh, PA, 15260
AJR; 138(6):1181-1183 1982

Gallium-67 was used to evaluate cystosarcoma phyllodes (CP) of the breast, local recurrences of CP, and distant metastases of CP in a 56-yr-old woman. The patient presented 1 yr after the discovery of swelling of the right breast and shortly after observation of a bloody purulent discharge from the nipple of the involved breast. A radical mastectomy was performed. Nodules observed at the mastectomy site 4 mo after surgery were evaluated using gallium-67. Abnormalities of gallium uptake were observed in the lung and liver. (13 Refs)

3. A MICRO-ASSAY FOR ESTROGEN RECEPTOR IN BREAST TUMOR WITH USE OF 125I-LABELED ESTRADIOL.

Van NT, Fritsche HA, Trujillo JM
Dept. Lab. Medicine, Univ. Texas M. D. Anderson Hosp. and Tumor Inst. at Houston, Houston, TX, 77030
Clin Chem; 28(6):1303-1308 1982

The concentration of estrogen receptor protein in breast-tumor tissue is generally expressed in units of femtomoles of estradiol bound by the receptor per milligram of cytosol protein. The sensitivity of the estrogen receptor radioligand assay is therefore related to the specific activity of the steroid label used for the binding assay, the amount of the receptor protein in the vol of cytosol used, and the protein concentration in the cytosol. In this paper, we discuss factors affecting the sensitivity of the estrogen receptor assay and present various approaches for optimizing the assay. We also describe a procedure that involves a radioiodinated estradiol of high specific activity, a micro-technique for preparing tumor cytosol, and a micro-assay procedure with which the estrogen receptor protein can be measured in as little as 50 mg (wet weight) of tissue. (Author abstract) (7 Refs)

CENTRAL NERVOUS SYSTEM NEOPLASMS

4. BRAIN TUMOR EVALUATION USING RB-82 AND POSITRON EMISSION TOMOGRAPHY.

Yen CK, Yano Y, Budinger TF, Friedland RP, Derenzo SE, Huesman RH, O'Brien HA
(c/o Budinger) Donner Lab., Room 230, Univ. California, Berkeley, CA, 94720
J Nucl Med; 23(6):532-537 1982

Positron emission tomography of the brain with 75-sec rubidium-82 obtained from a portable generator (25-day Sr-82 to Rb-82) was used to evaluate the integrity of the blood-brain barrier (BBB) in patients with brain tumors. Rubidium is normally excluded from the central nervous system by the intact BBB, but when the BBB is disrupted by a tumor, Rb enters and pools in the extravascular spaces of the central nervous system. Since Rb is also rapidly cleared from the blood, a high tissue-to-blood ratio of the Rb-82 tracer is achieved in regions of BBB disruption after intravenous injection. With dynamic positron emission tomographic imaging, the extravasation of the Rb tracer can be evaluated independent of the intravascular Rb concentration, and very small changes in the BBB permeability can be detected. These results of our studies in eight patients show that this technique is a promising method for evaluation of the BBB integrity in brain-tumor patients. (Author abstract) (21 Refs)

5. PROTON NMR IMAGING OF GRADE II ASTROCYTOMA (MEETING ABSTRACT)

Kistler JP, Buonanno FS, Pykett IL, Heros RC, Black ML, Busis N, Richardson EP, New PF, Goldman MR, Burt TC, Brady TJ, Newhouse J, Hinshaw W, Pohost GM
No affiliation given
1982 Annual Meeting of the American Association of Neurological Surgeons, April 25-29, 1982, Honolulu, Hawaii. American Association of Neurological Surgeons 234 pp., 1982.

The basic principle of NMR (Nuclear Magnetic Resonance) is that many atomic nuclei carry an electrical charge and spin. They have a magnetic moment and are able to respond to the application of specific magnetic fields by absorbing and then re-emitting radiowaves. As such, the waves can be detected and used to generate spectra indicating the concentration of various chemical species of these nuclei. Example of NMR sensitive nuclei include H-1 (Proton), Fluorine-19, Carbon-13, Sodium-23, Phosphorous-31. Because protons are the most sensitive and abundant nuclei in brain tissue, they are currently the ones used to generate brain images. When the brain is placed in a constant but graded magnetic field, the magnetic moment of their protons align with the magnetic field. By applying a short burst radiowave at a specific resonance frequency, many of the protons absorb the energy and change the direction of their magnetic moment. As the protons realign themselves in the constant graded magnetic field, they reemit the radiofrequency energy which is then detected and analyzed for frequency and intensity. Because the constant magnetic field carries a gradient, spatial information of the 'relaxing' protons can be obtained and images made. We report here a 23-year-old male with progressive left hemiparesis. True 3-dimensional NMR imaging, at 6 MHz clearly detected a deep right frontal white matter lesion that allowed for a needle biopsy. CT scan did not clearly outline the lesion which proved to be a grade II to III astrocytoma on microscopic examination. Preliminary studies in patients have demonstrated NMR imaging to have a high brain lesion detecting capability. (no Refs)

6. CLINICAL RELEVANCE OF TWO DIFFERENT NUCLEAR MAGNETIC RESONANCE (NMR) APPROACHES TO IMAGING OF A LOW GRADE ASTROCYTOMA.

Buonanno FS, Pykett IL, Brady TJ, Black P, New PF, Richardson EP, Hinshaw WS, Goldman M, Pohost G, Kistler JP
(c/o Kistler) NMR Office, Res. 501, Massachusetts General Hosp., Fruit St., Boston, MA, 02114
J Comput Assist Tomogr; 6(3):529-535 1982

A young patient with progressive neurological deficit of uncertain cause underwent true three-dimensional nuclear magnetic resonance (NMR) imaging by the inversion-recovery and by the saturation-recovery techniques. Differences between the results of the two methods helped clarify the nature of the underlying disorder and revealed an extent of neoplasia greatly exceeding that suggested by x-ray computed tomography. The NMR imaging results were instrumental in selecting the site for

brain biopsy, which demonstrated a Grade II astrocytoma. (Author abstract) (28 Refs)

DIGESTIVE NEOPLASMS

7. ECT AND LIVER SCINTIGRAM IN THE DIAGNOSIS OF LIVER TUMOR.

Nishikawa J
Dept. Radiology, Faculty Medicine, Univ. Tokyo, Tokyo, Japan
Nippon Igaku Hoshasen Gakkai Zasshi; 41(11):1091-1104 1981

Single photon emission tomography using rotating chair (ECT) was examined basically and clinically. ECT system consists of gamma camera (Searle LFOV), computer (Scintipac 1200) and rotating chair. Data were sampled every 10 degrees (36 projections) and recording using a 64 x 64 matrix on a computer. Tomographic sections were reconstructed using a filtered back-projection reconstruction algorithm with Shepp and Logan's filter. The reconstruction time was 35 sec/slice. ECT images were displayed as 64 x 64 matrix with 6 mm thickness. In the basical study, ECT had the resolution (FWHM), 1.5 cm to 2.0 cm, and could depict cylindrical defect of which diameter was 1.4 cm. ECT image could reveal spherical defect, 1.9 cm in diameter, which was in Alderson's liver phantom, while scintigram could not show this defect. ECT was examined in 74 patients. Fifty of 74 cases were the materials of this study, who were confirmed whether they had liver tumor or not by XCT, sonogram, antiography, surgery, etc. The clinical usefulness of ECT was analyzed by five radiologists using ROC (receiver operating characteristic) curve comparing with liver scintigrams. In four radiologists, ROC curve of ECT drew higher curved line than that of liver scintigrams. In one radiologist, ROC curves of both studies were almost the same. The reason why ECT was superior to liver scintigram is that ECT could easily differentiate liver mass from physiological defects such as gall bladder fossa, port hepatis, etc. Comparison between ECT and liver scintigram was also done about depiction of liver mass, and both studies showed almost the same ability. In conclusion, ECT using rotating chair is easy to handle and does not disturb routine work much, and offers diagnostic information which can not be obtained by the liver scintigram. (Author abstract) (13 Refs) (In JPN)

8. IMAGE-PRODUCING DIAGNOSIS OF HEPATIC METASTASES: SONOGRAPHY, COMPUTER TOMOGRAPHY, AND SCINTIGRAPHY.

Gerhardt P, Gluck E, Proussalis A
Abteilung fur Rontgendiagnostik, Zentrum fur Chirurgie, Im Neuenheimer Feld 110, D-6900 Heidelberg, W. Germany
MMW; 124(13):306-309 1982

The relative values of ultrasonography (US), computer tomography (CT), and scintigraphy (SG) for diagnosis of hepatic metastases (HM) are reviewed. The importance of diagnosis stems from the high rate of hepatic metastases from primary tumors such as mammary, bronchogenic, and colorectal carcinomas, Hodgkin's disease, and malignant melanoma. Diagnosis by US has been improved by development of real-time scanners. US can detect HM with diameters of at least 1-2 cm. Echo-dense HM are more easily detected than echo-sparse HM. Differences in tissue structure can be differentiated by US, but differentiation of HM of different primary origins is not possible; aspiration biopsy is required for determination of tumor type. Diagnosis by US can be complicated by the presence of intestinal gas. The seriousness of disadvantages of US depends on the experience of the examiner. US has a reported sensitivity of 67-93% and a specificity of 94-100%. CT provides clear differentiation of organ structures. Demonstration of metastases can be improved by bolus injection of contrast medium prior to the scan. CT has a reported sensitivity of 85.5-96% and specificity of 86-97.5%. SG provides less precise information than either US or CT. Emission CT improves accuracy somewhat over conventional SG. SG has a reported sensitivity of 82-94% and specificity of 75-90%. Because of the higher cost, and to some extent the radiation exposure, of CT, US is recommended as the first step in the diagnosis of HM, followed by SG. CT is recommended only when insufficient information is obtained by the first two methods. (29 Refs) (In GER)

9. FOLLOW-UP RESULTS OF LIVER ULTRASONOGRAPHY AND LIVER SCINTIGRAPHY AFTER ADJUVANT CHEMO-/IMMUNOTHERAPY FOR MALIGNANT MELANOMA.

Crone-Munzebrock W, Voigt H, Denkhaus H
Radiologische Klinik, Universitatskrankenhaus Eppendorf, Martinistr. 52, D-2000 Hamburg 20, W. Germany
Aktuel Dermatol; 8(2):45-48 1982

Late effects of adjuvant chemoimmunotherapy on the liver were studied by ultrasonography (US) and scintigraphy (SG) in patients with histologically confirmed primary malignant melanoma in Stages T1-3N0M0/Clark level III-V. Patients with a history of liver disease or abnormal liver findings before therapy were excluded from the study. Tumors were removed surgically. Postoperatively patients received chemotherapy (CT) with dacarbazine (250 mg/square meter body surface iv, administered on 5 consecutive days/cycle, followed by a 3-wk interval); CT lasted 6 mo. Immunization with BCG of type Pasteur F followed. Immunization was carried out by multipuncture, weekly for 10 mo and monthly thereafter. US was performed prior to, immediately after, and 8-16 mo (av 12.8 mo) after completion of CT. Hepatic SG was performed prior to, immediately after, and 10-18 mo (av 15.3 mo) after completion of CT. US of 15 patients indicated abnormal findings in only 4 immediately after CT; 3/3 of these showed normalization at the later examination. SG of 24 patiens indicated abnormal findings in 19 patients immediately after CT; 17 of these patients showed normalization at the later examination. Results indicate that chemoimmunotherapy produces reversible alterations in hepatic parenchyma. No late effects of therapy were noted. (22 Refs) (In GER)

10. COMPARATIVE STUDY OF ULTRASONOGRAPHY AND SCINTIGRAPHY IN LIVER METASTASES DETECTION IN CASES OF COLORECTAL CARCINOMA.

Arnaud JP, Daly R, Leguillou A, Adloff M
Service de Chirurgie, C.M.C.O., 19, rue Louis Pasteur, F 67300 Schiltigheim/Strasbourg, France
J Radiol; 63(2):97-100 1982

A comparative study has been realized to test the accuracy of ultrasonography and scintigraphy for detecting the presence of liver metastases in 305 patients with colorectal carcinomas. Presence or absence of hepatic metastases has been affirmed by laparotomy and biopsy. In the 47 cases with metastases, the sensitivity of ultrasonography was 93%, that of scintigraphy being 76%. In 258 cases without metastases the specificity of ultrasonography was 97%, that of scintigraphy being 92%.

These results, confirmed by report in the published literature, show that ultrasonography should be the first examination for suspected hepatic metastases. (Author abstract) (24 Refs) (In FRE)

11. NONINVASIVE DIAGNOSIS OF PRIMARY HEPATIC TUMORS. VALUE OF DETERMINATION OF AFP COMBINED WITH HEPATIC SCINTIGRAPHY.

Plaitano G, Tesauro P, Siniscalchi A, Di Simone A
Servizio di Endoscopia Digestiva, Universita di Napoli, Naples, Italy
Fegato; 27(3):207-211 1981

Forty patients (27 men and 13 women, 25-70 yr old) with hepatocellular carcinoma diagnosed by biopsy, laparoscopy or both were subjected to hepatic scintigraphy and to alpha-fetoprotein (AFP) test. The AFP levels were pathologically elevated (above 10 ng/ml) in 80% of all patients, and in 67% were above 100 ng/ml. The liver scans showed definite space-occupying lesions in 85% of all patients and a patchy distribution of the radioisotope as seen in chronic liver disease, eg, in cirrhosis, in the other. Both the liver scans and the AFP tests were positive in 97% of all patients, ie, it was possible to establish the correct diagnosis by the combination of the two methods in 97% of the patients. (19 Refs) (In ITA)

12. COMMENTS ON RADIONUCLIDE HEPATIC SCANNING.

Rothschild MA, Oratz M, Schreiber SS
Nuclear Medicine Service, Veterans Admin. Medical Center, New York, NY
Semin Liver Dis; 2(1):29-40 1982

The techniques involved in radionuclide hepatic scanning are reviewed and the available radiopharmaceuticals and imaging systems evaluated. The most commonly used radiopharmaceuticals used for hepatic imaging are 99mTc-S colloid, 131I Rose Bengal, 99m-Tc-labeled iminodiacetic acid derivatives, and 67Ga. The use of these compounds for assessing hepatic functional and biliary clearance activity, gallbladder imaging, localization of malignant and inflammatory lesions, cirrhosis diagnosis, and disseminated disease evaluation is presented. (68 Refs)

13. SCINTIGRAPHIC DEMONSTRATION OF ACUTE GASTROINTESTINAL BLEEDING IN A COLONIC INTERPOSITION.

Fisher MF, LiPuma JP, Agnone J
(c/o LiPuma) Dept. Radiology, Univ. Hosp. Cleveland, 2074 Abington Road, Cleveland, OH, 41106
Clin Nucl Med; 7(5):225-226 1982

Detection of acute gastrointestinal bleeding by Tc-99m sulfur colloid scintigraphy is described. The advantages of scintigraphy in this clinical situation are discussed. (Author abstract) (5 Refs)

ENDOCRINE NEOPLASMS

14. SIGNIFICANCE OF THYROGLOBULIN AS A TUMOR MARKER IN THE SERUM OF PATIENTS WITH DIFFERENTIATED THYROID CARCINOMA: LONGITUDINAL AND CROSS-SECTIONAL STUDIES.

Schatz H, Grebe S, Maser E, Teuber J, Horn W, Schroder O, Schatz C
III. Med. Univ.-Klinik und Poliklinik, Rodthohol 6, D-6300 Giessen, W. Germany
Klin Wochenschr; 60(9):457-464 1982

For evaluating the clinical significance of thyroglobulin measurements for the follow-up of patients with differentiated thyroid carcinoma, thyroglobulin was determined radioimmunologically during the past 2 yr (up to 12x) in 40 patients after withdrawal of thyroid hormone. Thyroglobulin values were compared with whole-body scintigrams after radioiodine. Thyroglobulin antibodies, which may interfere in the radioimmunoassay for thyroglobulin, were also estimated by a radioimmunologic method. In the majority of cases, thyroglobulin levels corresponded to the scintigrams, however, the thyroglobulin level appeared to be a more precise index for changes in tumor tissue mass. In one patient the scintigram was negative, whereas considerable amounts of thyroglobulin were measured in the serum: x-ray tomography revealed a lung metastasis in this case. On the other hand, thyroglobulin was undetectable in the sera of patients who exhibited distinct metastases in the scintigram. Thyroglobulin can be regarded as a tumor marker in patients thyroidectomized for differentiated thyroid carcinoma. However, its determination can certainly not replace whole-body scintigraphy as postulated by several authors, although thyroglobulin measurement appears to be superior to scanning in some cases. A combined application of iodine scanning and thyroglobulin radioimmunoassay is thus advisable in the follow-up of patients with differentiated thyroid carcinoma. (Author abstract) (18 Refs) (In GER)

15. ABLATION OF NONMALIGNANT THYROID REMNANTS WITH LOW DOSES OF RADIOACTIVE IODINE: CONCISE COMMUNICATION.

Ramacciotti C, Pretorius HT, Line BR, Goldman JM, Robbins J (c/o Robbins), NIH, Building 10, Room 8N315, Bethesda, MD, 20205
J Nucl Med; 23(6):483-489 1982

Ablation of nonmalignant thyroid tissue (present after thyroid carcinoma surgery) with I-131 is associated with decreased recurrence rates and probably increased survival. Low-dose therapy (30 mCi) has been controversial. We studied the effects of low-dose therapy in 20 patients. Complete ablation of thyroid tissue, using a 1-1.5-mCi test dose, occurred after a single 30-mCi dose in eight patients and in one of seven patients who were treated again with the same dose. In three of these patients, a minimally positive scan at 6 mo became negative without further therapy. These results compared favorably with those of a single 75-mCi dose. In 19 of the 20 patients, one or two doses of 30 mCi reduced thyroid iodine uptake to a level much less than that of normal nonthyroid neck tissues; ie, one that causes no significant interference with the diagnosis or therapy of malignant lesions. We conclude that the use of up to two 30-mCi doses at 6-mo intervals is a reasonable approach to ablation therapy, particularly in young subjects with well-differentiated thyroid cancer. Besides minimizing whole-body and gonadal irradiation exposure, the advantages are greater convenience and reduced expense with a dose that can be given to outpatients. The disadvantages are that about half of the pa-

tients will require more treatment, with attendant hypothyroid periods and delay in achieving ablation, and that any tumor in the thyroid remnant may be inadequately irradiated. A long-term, prospective study is needed to evaluate the importance of these factors. The persistence of a positive scan after two 30-mCi doses appears to be an indication for increasing the subsequent dose, as would the detection of I-131 uptake in tumor tissue at any stage. In older patients and in poorly differentiated thyroid cancer, high-dose therapy at the outset may be preferable. (28 Refs)

16. POSTOPERATIVE DIAGNOSIS AND THERAPY OF THYROID MALIGNOMAS BY NUCLEAR MEDICINE (MEETING ABSTRACT)

Hundeshagen H
Abteilung fur Nuklearmedizin und Spezielle Biophysik, Medizinischen Hochschule Hannover, Karl-Wiechert-Allee 9, D 3000 Hannover 61, W. Germany
J Cancer Res Clin Oncol; 103(Suppl):A38 1982

Based on experiences with 855 patients with thyroid malignomas which were treated in our department during the last ten years, suitable diagnostical and therapeutical measurements are explained. In 50% of the patients, residual thyroid tissue was no longer detected after treatment with 100 mCi131I. The same status was reached in 70% of the patients after treatment with 300 mCi131I treatment 20% of these accumulated iodine, while 50% stored iodine only after elimination of residual thyroid tissue. Metastases which did not accumulate radio-iodine were found in 30% of the controlled patients. It must be noted that a control dose of 5-10 mmCi131I was necessary to enable the detection of metastases. In this respect thyreoglobuline determination also gains importance. Both metastases are not always detectable by 99mTc skeleton scintigraphy. Iodine-storing lung metastases are detectable by chest x-ray only much later. For the discussion of the projected control- and therapeutical measurements the survival fraction is less important than the recurrence fraction. The strict and centralized control and guidance of the patients with the aid of computerized data handling is of special importance. The radiation dose administered to the patients receiving 100 mCi131I (initial therapy) is 27 rd, the effective half life is 17.5 h. Radiation effects observed on the erythropoietic organs were relatively small even after repeated dosage. A consistantly established histological diagnosis and a strict control, followed by further therapy whenever necessary, as well as central guidance of the patients by an institution which keeps a specifically suited cancer register will increase the effectivity. (no Refs)

17. DISAPPEARANCE RATE OF ENDOGENOUSLY RADIOIODINATED THYROGLOBULIN AND THYROXINE AFTER RADIOIODINE TREATMENT.

Jeevanram RK, Shah DH, Sharma SM, Ganatra RD
Radiation Medicine Centre, Bhabha Atomic Res. Centre, Tata Memorial Centre Annexe, Parel, Bombay-400 012, India
Cancer; 49(11):2281-2284 1982

Endogenously radioiodinated thyroglobulin (tg) and thyroxine (T4), in the circulation following, therapeutic doses of radioiodine were studied in five patients with differentiated thyroid carcinoma. Radioactive serum was fractionated on a Sephadex G-200 and the various radioactive peaks thus obtained were analyzed for their biochemical and immunologic characteristics using precipitation with trichloroacetic acid (TCA) and antithyroglobulin antibody extraction with acidified n-butanol and electrophoresis on agar gel. The disappearance rates of endogenously labeled tg and T4 were 3.12 +-0.396 days and 10.14 +-1.81 days, respectively. (Author abstract) (16 Refs)

18. PREOPERATIVE TECHNETIUM-99M IMAGING OF A SUBSTERNAL PARATHYROID ADENOMA.

Naunheim KS, Kaplan EL, Kirchner PT
(c/o Kaplan) Dept. Surgery, Univ. Chicago Hosp., Box 402, 950 East 59th St., Chicago, IL, 60637
J Nucl Med; 23(6):511-513 1982

Preoperative radionuclide imaging of parathyroid glands has been attempted using various nuclides with varying degrees of success. We present a case report of preoperative location of a mediastinal parathyroid adenoma with pertechnetate (Tc-99m) imaging. The literature on parathyroid imaging with technetium is reviewed. We conclude that pertechnetate may have been overlooked as a useful imaging agent for parathyroid adenomas, especially for tumors located away from the thyroid, and that further investigation is warranted. (Author abstract) (13 Refs)

GENITOURINARY NEOPLASMS

19. STATIC RENAL IMAGING WITH 99M-TC-DIMERCAPTOSUCCINIC ACID IN INFANCY AND CHILDHOOD.

Sztriha L, Pusztay G, Beviz J
Universitats-Kinderklinik, Postfach 471, H-6701 Szeged, Hungary
Monatsschr Kinderheilkd; 129(4):224-228 1981

Static renal imaging using 99m-Tc-dimercaptosuccinic acid (DMSA) was performed 90x in 79 infants and children. Indications for the procedure included suspected tumor, polycystic kidney, developmental anomalies, and trauma. Pathologic scintigraphic results were obtained in 36 cases. The method delivered a low radiation dose and provided good visualization of the shape, size, and position of the kidneys, as well as demonstrating parenchymal damage due to pyelonephritis. (25 Refs) (In GER)

GYNECOLOGIC NEOPLASMS

20. BONE SCANNING IN PATIENTS WITH CARCINOMA OF THE CERVIX (MEETING ABSTRACT)

Sostre S, Zaidi MK
University of Puerto Rico, School of Medicine, Puerto Rico, PR
AMPI Med Phys Bull; 7(1):11 1982

Whole body bone scans were performed on 34 patients with cervical carcinoma to evaluate the usefulness of the procedure in the detection of bony, urinary tract and soft tissue abnormalities in this disease. All the patients had IVP and BUN (blood-urea nitrogen). All patients with scintigraphic bone abnormalities or with osseous symptoms also had roentgenographic skeletal surveys. Six patients (14.7%) were correctly diagnosed to have metastatic bone disease by bone scanning. No false negative studies were found. The bone scan correctly identified 12 urinary tract abnormalities in 34 patients (12/34-35%). These included 6 non-functioning kidneys, 4 obstructed kidneys, 2 patients with renal ptosis and 2 with bladder compression due to pelvic masses. The bone scan missed only 1 case with urinary tract obstruction. In addition, the bone scan correctly identified five other miscellaneous conditions (which included lymphedema, bone fracture and avascular necrosis of

the femoral head) for an overall detection rate of 25 abnormalities in 34 patients. Bone scanning is a very useful tool in the evaluation of the patient with advanced carcinoma of the cervix. It not only detects metastases to bone very early, but also aids in the identification of urinary tract abnormalities and in the detection of other non-neoplastic bone disease and soft tissue abnormalities. (no Refs)

21. ROLE OF 57CO-BLEOMYCIN IN THE DIAGNOSIS OF CANCER OF THE UTERINE CERVIX. RESULTS OF 4 YEARS OF INVESTIGATIONS.

Pertynski T, Durski K, Babinska E, Bartuzel T
Zaklad Medycyny Nuklearnej i Radiologii, AM w Lodzi, ul. Sterlinga 5, 91-425 Lodz, Poland
Pol Przegl Radiol; 45(6):349-353 1981

Sixty-four patients (22-77 yr old) with preinvasive or Stage I-IV carcinoma of the uterine cervix were subjected to 57Co-bleomycin scintigraphic examinations to establish the extent of the malignant process. Foci of 57Co-bleomycin uptake were found in all patients. The method was found to be especially useful in patients with preinvasive carcinomas in whom a sensitivity of 85.5% and specificities of 93.8-96.8% were achieved. Uptake was found most often in the iliac crest in Stage II-IV patients. (20 Refs) (In POL)

HEAD AND NECK NEOPLASMS

22. SIGNIFICANCE OF NUCLEAR MEDICINE IN DIAGNOSTICS OF TUMORS OF THE OROPHARYNX AND CAVITY OF THE MOUTH (MEETING ABSTRACT)

Schmid L, Langhammer H, Schmeisser KJ, Koppers B, Pabst HW
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J Cancer Res Clin Oncol; 103(Suppl):A58 1982

The contribution of nuclear medicine to the diagnosis of tumors of the oropharynx and the cavity of the mouth consists in the positive tumor scintigraphy with Gallium-67 and Tc-99m labeled phosphate complexes. Gallium-67 is characterized by a high affinity to tumorous tissue with no regard to the histomorphological type of the tumor. It is accumulated in about 80% of malignant tumors but is not specific for malignancy and is also observed especially in case of inflammation. Therefore, a positive Ga-67 scintigram is no proof for malignoma. However, the Ga-67-affinity is dependent on the vitality of the malignoma and decreases in cases of successful tumor-specific therapy (irradiation, chemotherapy) and disappears completely if tumor devitalization has been achieved. A persistent accumulation corresponds to incompletely devitalized tumor tissue or tumor recurrence. In bone scintigraphy all bone processes are detectable due to their increased metabolisms. About 95% of the metastatic foci can be discovered. Usually scintigraphy becomes positive prior to radiological findings and the extent of tumors can be determined more precisely. The bone scintigraphy also comprises the evaluation of therapy effects on bone metastases. A decrease in malignant foci number, extent and intensity of accumulation can be regarded as a proof of successful therapy. If the therapy chosen fails, scintigraphic findings increase and therapy can be changed even before subjective complaints or pathological serum parameters occur. (no Refs)

23. RADIONUCLIDE SALIVARY SCAN IMAGING OF A 'FUNCTIONING' MALIGNANT PAROTID TUMOR (MUCOUS-PRODUCING PAPILLARY ADENOCARCINOMA).

Noyek AM, Greyson ND, Fernandes BJ, Chapnik JS
Suite 207, 99 Avenue Road, Toronto, Ontario, Canada M5R 2G5
J Otolaryngol; 11(2):83-85 1982

A 'functioning' malignant parotid tumor was imaged on a pertechnetate salivary scan of a 72-yr-old woman with a right parotid mass. The scan showed increased accumulation of the pertechnetate anion in focal distribution in the plane of the tumor mass, and the functioning nature of the tumor was enhanced on the washout salivary scan image. Sites of pertechnetate accumulation were similar to the extracellular fluid spaces of the Warthin's tumor and intracellular accumulation in oncocytomas, but the mechanism of pertechnetate accumulation in this mucous-producing papillary adenocarcinoma was uncertain. Functioning tumors on salivary scans have been thought to be benign, so this case suggests that careful interpretation is important, especially in elderly women. (6 Refs)

HEMATOLOGIC, RETICULOENDOTHELIAL, AND LYMPHATIC NEOPLASMS

24. SCINTIGRAPHIC INVESTIGATIONS WITH 57CO-BLEOMYCIN AND 67GA-CITRATE IN PATIENTS WITH MALIGNANT LYMPHOMAS.

Brykalski D, Fajndt S, Studniarek M, Surma M, Wiankowski H, Kosmider A
Zaklad Medycyny Nuklearnej i Radiologii, AM w Lodzi, ul. Sterlinga 5, 91-425 Lodz, Poland
Pol Przegl Radiol; 45(6):343-347 1981

The diagnostic value of 57Co-bleomycin scintigraphy in determining the extent of the pathological process was studied and compared with that of 67Ga-citrate in 81 patients with malignant lymphomas. Hodgkin's disease in 14 men and 17 women was clinically diagnosed, and non-Hodgkin's lymphoma in 22 men and 28 women. The sensitivity of the 57-Ga-citrate scintigraphy was found to be 70%, its specificity 72%. The sensitivity and specificity of the 57Co-bleomycin scintigraphy were 75% and 83%, respectively. The superiority of 57Co-bleomycin scintigraphy over 67Ga-citrate was particularly evident in the detection of lesions in the regions of the head, abdomen and pelvis. (18 Refs) (In POL)

MUSCULOSKELETAL NEOPLASMS

25. 201TL SCINTIGRAPHY FOR BONE LESIONS.

Suzuki S, Shibuya M, Ohki I, Sato Y, Mibu S
Dept. Orthopedics, Jichi Medical Sch., Tochigi, Japan
Nippon Seikeigeka Gakkai Zasshi; 55(9):1092-1094 1981

Among 47 patients with malignant bone tumors examined by 201Tl-chloride scintigraphy (201Tl), positive findings were obtained in 14/14 primary bone tumors and in 25/25 osteolytic tumors, whereas 2/8 osteoblastic tumors were negative. All patients having cold lesions with 99mTc bone scintigraphy were positive with 201Tl. In contrast, 11/23 patients with benign bone tumors and all of the 43 non-tumorous bone lesions but 2

fibrous dysplasia and 5 acute osteomyelitis lesions were negative. Except in the case of an osteoblastic metastatic tumor, one can deny the presence of a malignant tumor when 201Tl is negative. (no Refs) (In JPN)

RESPIRATORY AND CARDIOVASCULAR NEOPLASMS

26. 67GA-CITRATE LUNG SCINTIGRAPHY IN PULMONARY CARCINOMA.

Apostolidis P, Kostaki P
Dept. Nuclear Medicine,, Theagenion Medical Inst., Thessaloniki, Greece
Excerpta Med Int Congr Ser; 558:169-174 1982

Lung scintigraphy with 67Ga-citrate was performed in 129 patients (23-86 yr old, mean age 66 yr) with suspected pulmonary malignancies. All patients had complete clinical and laboratory work-up. Ten patients were excluded from the study because a definite diagnosis could not be established. Histological diagnosis could not be established in four patients. In the remaining 115 patients the diagnosis was histologically established; 14 patients had benign lesions and 101 malignant. The patients were given 3 mCi of 67Ga-citrate and 48-72 hr later anterior and posterior lung scans were obtained using a double-head 5-inch rectilinear scanner. The scintigrams obtained were interpreted without taking into consideration the patients' clinical or x-ray image. Three grades of positive pictures were assigned depending on the clearest image corresponding to well-, moderate-, and ill-defined positive images. In benign lesions, the scintigrams were characterized negative in seven patients and equivocal in four. Two patients had ill-defined positive diagnosis and one had moderate positive image. The examination was negative in 10/105 patients with malignant disease and equivocal in 11. Positive images were ill-defined in 12 patients, moderate in 30, and well-defined in 42. Results indicate that 67Ga-citrate scintigraphy represents a valuable diagnostic examination for the evaluation of patients with suspected pulmonary malignant lesions, giving an 82% true-positive and 9% negative diagnosis. (11 Refs)

27. ROLE OF GALLIUM 67 THORACIC SCINTIGRAPHY IN THE DIAGNOSIS AND STAGING OF PATIENTS SUSPECTED OF BRONCHIAL CARCINOMA.

Pannier R, Verlinde I, Puspowidjono I, Willemot JP
Augustijnenrei 7, 8000 Brugge, Belgium
Thorax; 37(4):264-259 1982

Gallium 67 (67Ga) lung scanning was performed in 100 consecutive cases in which because of the history, clinical data, or abnormal radiological findings, a bronchial carcinoma was suspected. This study allows the conclusion that a negative as well as a positive scan is an important element in the diagnosis of some cases of bronchial carcinoma. The method is most helpful in the preoperative diagnosis of circumscribed peripheral shadows and in the assessment of suspected hilar enlargement; it may even visualize hidden malignant tumors. Gallium 67 scanning is also valuable in the assessment of hilar and mediastinal involvement in the presence of a proven primary lung tumor. This study supports the view that in the presence of a negative mediastinal scan the patient may be spared mediastinoscopy and be referred directly for operation. (Author abstract) (26 Refs)

28. LUNG SCANNING WITH 67GALLIUM CITRATE FOR DETECTION OF ACUTE RADIATION CHANGES.

Freeman CR, Lisbona R, Palayew M
Dept. Radiation Oncology, Montreal General Hosp., 1650 Cedar Ave., Montreal, Quebec, H3G 1A4, Canada
J Can Assoc Radiol; 33(1):25-27 1982

Radiogallium imaging plays a growing role in the investigation of acute and chronic inflammatory diseases of the lung. We studied a series of patients undergoing radiation treatment for carcinoma of the breast to evaluate the usefulness of imaging with 67gallium citrate in the detection of early radiation changes in the pulmonary parenchyma. In a series of 12 patients there was no correlation between the clinical and radiographic manifestations of radiation pneumonitis and the gallium scan. (Author abstract) (9 Refs)

29. THE VALUE OF LUNG SCINTIGRAPHY FOR PREOPERATIVE DIAGNOSIS OF MASSES IN THE LUNG.

Raptou E, Strauss L, Irngartinger G, Muller H, Georgi P
Inst. Nuclear Medicine, German Cancer Res. Center, Heidelberg, W. Germany
Excerpta Med Int Congr Ser; 558:175-183 1982

Results of ventilation and perfusion studies in 102 patients with suspected lung malignancy were compared with the surgical and computer tomography findings. Tumors included 43 squamous-cell carcinomas, 15 adenocarcinomas, 21 anaplastic carcinomas, 2 alveolar-cell carcinomas, 2 mesotheliomas, and 19 metastases. Most squamous-cell carcinomas were classified as central because the hilus region was involved by the primary tumor or by lymph node metastases. Most anaplastic carcinomas were central. Sensitivity of lung scintigraphy was 93%, while that of ventilation scintigraphy was 74%. (5 Refs)

30. LUNG-SCINTIGRAPHY IN THE CONTROL OF CHILDREN WITH MALIGNANCIES TREATED BY RADIOCHEMOTHERAPY.

Metz O, Fuchs D, Stoll W
Universitats-Kinderklinik, Carl-Zeiss-Stiftung, Kochstrasse 2, DDR-6900 Jena, E. Germany
Monatsschr Kinderheilkd; 129(9):529-533 1981

Lung scintigraphy (LSG) was performed to monitor children with malignant diseases. Combined telecobalt radiotherapy (RT) and cytostatic chemotherapy (CT) were administered to 16 children (9 boys and 7 girls) with tumors of the thorax and neck. Patients included six with Hodgkin's disease, five with non-Hodgkin's lymphoma (NHL), three with acute lymphatic leukemia, one with intrathoracic neuroblastoma sympathicum, and one with Ewing's sarcoma. Irradiation encompassed the epidiaphragmatic lymph nodes, intrathoracic tumors, or the mediastinum. Thirty-five LSG were performed in 16 children 1-60 mo (av 14.5 mo) after the start of therapy. LSG included 16 in the therapy phase and 19 after completion of successful therapy. Abnormal findings were obtained in all LSG. Up to 6 mo after irradiation, obstructions to perfusion were found only in irradiated lung parenchyma; after 6 mo (during CT) obstructions became more diffuse in the lung parenchyma. CT alone was administered to 14 children (5 boys and 9 girls), including 10 with acute lymphatic leukemia and one each with acute myeloid leukemia, NHL, histiocytosis X, and osteogenic sarcoma. LSG was performed prior to treatment in 2 patients and 1-55 mo (av 14 mo) after the start of therapy in 12 children; 16 LSG were performed during CT and 2 LSG after successful therapy. Both LSG before therapy

produced normal findings. All LSG performed after the start of therapy were abnormal. However, LSG performed after completion of CT or CT + RT showed some improvement. Changes in perfusion of lung parenchyma by the 99mTC scintigraphic medium were attributed to tissue changes produced by RT and/or CT. (5 Refs) (In GER)

MISCELLANEOUS

31. LOCALIZATION OF CARCINOMAS BY PHOTOSCANNING AND TOMOSCINTIGRAPHY AFTER INJECTION OF RADIOLABELLED MONOCLONAL ANTI-CEA ANTIBODIES (MEETING ABSTRACT)

Mach JP, Buchegger F, Berche C, Lumbroso JC, Forni M, Ritschard J, Haskell C, Girardet C, Schreyer M, Accolla R, Carrel S
Ludwig Institute for Cancer Research, Lausanne, Switzerland
Hybridoma; 1(2):186 1982

Monoclonal antibodies (Mabs) against specific epitopes of carcinoembryonic antigen (CEA), labeled with 131I and normal mouse IgG (polyclonal or monoclonal), labeled with 125I were injected into nude mice bearing grafts of human colon carcinoma and in patients with large bowel, pancreas or medullary thyroid carcinomas. In nude mice the tumor uptake as compared to all normal tissues ranged from 7 to 15 fold greater for Mabs and 1-4 for normal IgG, resulting in specificity indices ranging from 4-6. In patients, the tumors resected after injection showed a Mabs uptake ranging from 2 to 10 and specificity indices ranging from 2-7. Detection of 131I Mabs by standard photoscanning, helped by computerized subtraction of 99mTc labeled albumin, allowed the localization of 14 carcinoma in 28 patients. Detection of the same labeled Mabs by single photon emission computerized tomography (SPECT) allowed the localization of 16 tumor sites out of 17 studied in 17 other patients. The results indicate that the use of the most modern tool of immunology (Mabs) and of nuclear medicine (SPECT) improves the specificity and sensitivity of immunoscintigraphy. Furthermore, we think that such detections and the paired labeling experiments described, should be performed in nude mice and in patients with each new Mabs against solid tumors which are seriously considered for various forms of passive immunotherapy. Although no side effects were observed, we consider that these injections in patients should be restricted to strictly controlled scientific studies. (1 Ref)

32. RADIOIMMUNOSCINTIGRAPHY WITH 123I MONOCLONAL ANTIBODY (MEETING ABSTRACT)

Epenetos AA, Nimmon CC, Mather S, Hawkins LR, Granowska LR, Britton KE
St Bartholomew's Hospital, London EC1, England
Nucl Med Communications; 3(2):123 1982

The recognition of tumor associated antigens, the development of the monoclonal antibody technique by Kohler and Milstein, the experience with radioiodination of antibodies in immunoassay, and the regular supply of cheap 123I from AERE Harwell bring together the requirements for radioimmuno detection of cancer in man. Experiments in 19 nude mice bearing human colon adenocarcinoma showed visible uptake in all tumors at 24 hours of radioiodine labelled monoclonal antibody, ranging from 0.5-25% of the injected dose, mean 6%. That the uptake was cancer cell specific was confirmed by autoradiography. Trials are underway using 123I labelled monoclonal antibody against human milk fat globule 1 and 2 antigens, which react with breast and ovarian cancers. Initial problems occurred in the radioiodination of this monoclonal antibody due to low specific activity of the 123I used. This has been overcome by the use of 123I supplied 'dry'. Undesirable uptake may be seen in heart and stomach. Initial studies in seven patients showed uptake at six known sites of tumor, equivocal uptake at two sites and no uptake at three sites. (1 Ref)

33. IMAGE ENHANCEMENT IN IMMUNOSCINTIGRAPHY (MEETING ABSTRACT)

Perkins AC, Hardy JG, Whalley DR, Pimm MV, Farrands PA
Department of Medical Physics, Queen's Medical Centre, Nottingham, England
Nucl Med Communications; 3(2):122 1982

Radiolabelled monoclonal antibodies to tumor associated antigens have been investigated as radiopharmaceuticals for tumor localization. In general, the target-to-non-target (T:NT) ratios are too low for satisfactory gamma camera imaging. Dual-isotope imaging and background subtraction techniques are applied to enhance the T:NT ratios. Experiments have been undertaken using phantoms to optimize image enhancement. Iodine-131 was used to represent the antibody distribution and technetium-99m and indium-113m the activity in the non-tumor tissues. Both the technetium and the indium corrected images resulted in an enhancement of the T:NT ratio; the indium correction being the more appropriate for deep seated lesions. In vivo studies with radioiodinated anti-human tumor monoclonal antibody (791T/36) have been undertaken in immuno-deprived CBA mice bearing osteogenic sarcoma xenografts. Image enhancement resulting in T:NT ratios of up to 10:1 was achieved with both technetium-99m and indium-113m corrections. In humans with colorectal tumors uptake ratios of 8:1 have been obtained using the same monoclonal antibody. (no Refs)

34. IN VIVO RADIOIMMUNOLOGICAL LYMPHOSCINTIGRAPHY IN CANCER. THE IMPLICATIONS OF POSITIVE FINDINGS.

Deland FH, Goldenberg DM
Dept. Nuclear Medicine, Univ. Kentucky, Albert B. Chandler Medical Center, Lexington, KY, 40536
J Can Assoc Radiol; 33(1):4-9 1982

Radionuclide-labeled antibodies to tumor-associated antigens were applied to the detection of the lymphatic spread of carcinoma by the technique of lymphoscintigraphy. In women with proven carcinoma of the breast, all of whom had clinical or surgically proven axillary metastases, 100% of metastases were detected by gamma imaging. In three cases of squamous cell carcinoma of vulva, one with bilateral inguinal metastases, one with ipsilateral metastases, and one with no metastases, imaging revealed that I-131 labeled antibodies were sequestered bilaterally in the inguinal lymph nodes of all three patients. Submucosal injections of the uterine cervix with labeled antibodies were performed in patients with carcinoma of the cervix, and again sequestration of radioactivity was detected in pelvic nodes. Subsequent hysterectomy with lymph node dissection revealed high levels of radioactivity in specific lymph nodes but no evidence of metastatic tumor. In view of previous work by Nossal and his group, we speculate that the sequestration of the antibody was based on trapping of the antigen by the lymph nodes, and an antibody-antigen reaction on the surface of cells within the nodes. To prove this hypothesis, appropriate animal experiments were performed. The detection of antigen trapping

may have important implications in the diagnosis and therapy of cancer. (Author abstract) (37 Refs)

SELECTED PRE-CLINICAL STUDIES

35. SPECIFICITY AND TUMOR LOCALIZATION OF A MONCLONAL ANTIBODY (MA) DEFINING A HUMAN GLIOMA ASSOCIATED EXTRACELLULAR MATRIX ANTIGEN (MEETING ABSTRACT)

Bourdon MA, Wikstrand CJ, Coleman RE, Bigner DD
Duke University Medical Center, Durham, NC
Abstracts of the 58th Annual Meeting, June 11-13, 1982, Philadelphia, Pennsylvania. American Association of Neuropathologists 386 pp., 1981.

We have used MA81C6, generated against the glial fibrillary acidic protein positive human glioma cell line U-251MG, to examine the distribution and localization of a glioma-mesenchymal extracellular membrane, but not normal brain. Cell line and tissue specificities were assayed by cell surface radioimmunoassay (RIA), absorption analysis, and peroxidase-antiperoxidase (PAP) immunohistology. 131-I-MA81C6 tumor localization in U-251M6 nude mouse xenografts was examined by radioscintigraphy. MA81C6 specificity analysis showed that GMEM was present in extracellular matrix (ECM) of glioma cell lines (14/16), glioma xenografts (7/9), and proliferative endothelial basement membranes of GBM (10/11). GMEM was also expressed by cells of mesenchymal origin including sarcoma (2/6) and fibroblast (8/9) cell lines and ECM of liver and spleen sinusoids and kidney medulla. GMEM was not detected in adult and fetal brain, muscle, skin, meningiomas, medulloblastoma, and astrocytomas (5/6) examined. By RIA and PAP, MA81C6 did not cross-react with fibronectin, laminin, or collagen types I-V. 131-I-MA81C6 tumor localization in U-251MG-bearing nude mice showed specific MA81C6 localization in the glioma xenografts; in paired labeled experiments using a 125-I-labeled control immunoglobulin, tumors were clearly imaged by 131-I-radioscintigraphy within 48 hrs. (no Refs)

36. RADIOARSENIC LABELLED DIMETHYLCHLOROARSINE: SYNTHESIS OF A KEY INTERMEDIATE FOR THE DERIVATION OF A NEW GROUP OF RADIOPHARMACEUTICALS (MEETING ABSTRACT)

Hosain F, Emran A, Spencer RP, Clampitt KS
University of Connecticut Health Center, Farmington, CT, 06032
Nucl Med Communications; 3(2):101 1982

A number of dimethylarsinous acid esters of sulfhydryl containing biomolecules are analogues of sugars, amino acids, and steroids. Some of them were found to have carcinostatic properties. Dimethylchloroarsine (DCA) is a key intermediate for the derivation of several of these compounds. Different approaches for the synthesis of radioarsenic labelled DCA were explored. A procedure was then developed with specially designed glass apparatus where arsenic trioxide was used as the starting material. This allows the utilization of various radioisotopes of arsenic in the synthesis of radiolabelled DCA. Arsenic-76 was then used in the present study, since it was readily produced by the (n, gamma) reaction on arsenic trioxide in a nuclear reactor. Cyclotron produced radioarsenic, such as As-71, can also be converted to arsenic trioxide with small amounts of added carrier at the time of target processing. Arsenic-76 labelled DCA was then used for the derivation of labelled penicillamine and alcohol analogues: dimethylarsinopenicillamine (DAP) and dimethylarsinomercaptoethanol (DAM). Biodistribution studies were carried out in mice with tracer doses of radioarsenic labelled DAP and DAM. (1 Ref)

37. DEFEROXAMINE MESYLATE ENHANCEMENT OF 67GA TUMOR-TO-BLOOD RATIOS AND TUMOR IMAGING.

Koizumi K, Tonami N, Hisada K
Dept. Nuclear Medicine, Sch. Medicine, Kanazawa Univ., Takaramachi 13-1, Kanazawa 920, Japan
Eur J Nucl Med; 7(5):229-233 1982

The optimal interval between iv injection of 67Gallium and im administration of deferoxamine mesylate (DFO) required to enhance the lesion-to-blood ratios in tumor-bearing rats. The optimal interval and its clinical applications are reported. Three hr was found to be the optimal interval to produce a significant effect for DFO administered im, on the clearance of radioactivity from the blood of Yoshida's sarcoma-bearing rats. The enhancement effect on tumor imaging evaluated in five patients (8 lesions) was insufficient. Only one site had clearly visualized if compared with control images. (8 Refs)

38. USE OF TRICATECHOLAMIDE LIGANDS TO ALTER THE BIODISTRIBUTION OF GALLIUM-67: CONCISE COMMUNICATION.

Moerlein SM, Welch MJ, Raymond KN
(c/o Welch) Dept. Radiation Sciences, Washington Univ., 510 South Kingshighway, St. Louis, MO, 63110
J Nucl Med; 23(6):501-506 1982

The effect of the intravenous administration of the synthetic siderophore LI-CAM-C on the biodistribution of Ga-67 was investigated. The ligand was found capable of in vivo complexing with Ga-67, which hastened the renal clearance of the nuclide. The gallium concentration was decreased in all organs, with the exception of the liver and spleen, where we suggest that hydroxide precipitates interfere with gallium sequestration by LICAM-C. The gallium in abscess tissue was only slightly affected, giving rise to an increase in the Ga-67 abscess-to-soft-tissue concentration ratio when LICAM-C is administered. Dosimetry calculations show that the siderophore decreases the radiation burden from Ga-67 citrate. The advantages of clinical application of LICAM-C are discussed. (Author abstract) (27 Refs)

REVIEWS

39. BIOMEDICAL APPLICATIONS OF NUCLEAR MAGNETIC RESONANCE.

Granier R, Leterrier F, Gambini DJ, Viret J
Service de Medecine Nucleaire, HIA du Val-de-Grace, 74, bd de Port-Royal, 75230 Paris, France
Ann Radiol (Paris); 24(8):671-679 1981

In vitro analysis with nuclear magnetic resonance (NMR) seems particularly promising in the study of tumors. NMR has been used experimentally on a surgical specimen to visualize a breast tumor. Pulmonary tumors have been visualized in vivo with NMR. The quality of NMR images is currently mediocre but should improve as multiple factors which determine the

image resolution and the effects of distortion are better understood and corrected. Some factors are common to all NMR imaging techniques. These include the discordance of magnetic fields which lead to distortion effects and the attenuation of radiofrequency waves which vary for different areas of the body. Certain degradation factors are inherent only in certain methods. It is suggested that NMR may be used in the near future to establish immediate diagnoses of malignancy. The future of NMR in medical field depends on technological progress, on improvement of new methods, on the cost of NMR equipment, and on collaboration between engineers, physicists, and doctors. (50 Refs) (In FRE)

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BREAST NEOPLASMS

1. THE ROLE OF INTERNAL MAMMARY SCINTIGRAPHY IN RADIOTHERAPY PLANNING IN PATIENTS WITH BREAST CARCINOMA.

Smedley HM, Wright EP
Dept. Radiotherapy and Nuclear Medicine, Addenbrooke's Hosp., Cambridge, England

Clin Radiol; 33(2):155-159 1982

The pathological status of internal mammary chains at the time of presentation in patients with carcinoma of the breast carries important prognostic significance. The aggressive treatment of involved nodes may alter the course of disease favorably in terms of survival and local recurrence. Methods of accurately localizing and assessing the state of the internal mammary chain have been described previously. We present here the preliminary results of a series of patients studied with radioisotope techniques to assess anatomy and status of the nodes with special reference to radiotherapy planning. (Author abstract) (3 Refs)

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2. MALIGNANT PLEURAL EFFUSION AND TC-99M MDP ACCUMULATION.

Lamki L, Cohen P, Driedger A
Victoria Hosp., 375 South St., London, Ontario, N6A 4G5, Canada
Clin Nucl Med; 7(7):331-333 1982

Two case reports of malignant pleural effusion from breast carcinoma, with scans showing a striking accumulation of Tc-99m MDP, are presented. The Tc-99m MDP was in the pleural fluid and not in the pleura as demonstrated by shift with gravity. Possible mechanisms of malignant effusion accumulation of Tc-99m MDP are suggested. The scant literature on the subject is reviewed. (Author abstract) (7 Refs)

DIGESTIVE NEOPLASMS

3. TREATMENT OF ASYMPTOMATIC METASTATIC CANCER TO THE LIVER FROM PRIMARY COLON AND RECTAL CANCER BY THE INTRAARTERIAL ADMINISTRATION OF CHEMOTHERAPY AND RADIOACTIVE ISOTOPES.

Ariel IM, Padula G
137 East 36 St. Terrace, New York, NY, 10016
J Surg Oncol; 20(3):151-156 1982

Forty patients with asymptomatic metastatic cancer to the liver discovered at the time of laparotomy were treated by combined intrahepatic arterial chemotherapy and internal irradiation in the form of 90Yttrium microspheres. One group of 25 patients were treated by a catheter inserted at the time of operation and received 100 mCi; of 90Yttrium microspheres and 5-fluorouracil on a continuing basis. They survived an average of 26 mo (varying from 9 to 60 mo). The second series of 15 patients referred after surgery were treated by the percutaneous insertion of the catheter into the hepatic artery and received a bolus of combined chemotherapy consisting of Platinol, Methotrexate, and 5-fluorouracil. They survived an average of 31 mo, which varied from 12 to 60 mo. The dose of 100 mCi of 90Yttrium was well tolerated by the liver. Prospective studies are in progress, limiting the treatment to the internal irradiation to determine its precise role in the overall treatment of metastatic cancer to the liver. (Author abstract) (33 Refs)

4. CHOLESCINTIGRAPHY IN EXTRAHEPATIC BILIARY OBSTRUCTION.

Klingensmith WC, Kuni CC, Fritzberg AR
Div. Nuclear Medicine, Veterans Admin. Medical Center, Univ. Colorado Health Sciences Center, 4200 E. 9th Ave., Denver, CO, 80262
AJR; 139(1):65-70 1982

The effect of etiology on findings in cholescintigraphy in patients with extrahepatic obstruction was retrospectively evaluated in 29 patients. Of 11 patients with obstruction secondary to cancer, 7 (78%) of 9 had complete obstruction (delayed images were not obtained in 2) and 9 (82%) of 11 had a moderate to severe decrease in hepatocyte clearance. Of 12 patients with obstruction secondary to cholelithiasis, only 4 (36%) had complete obstruction (delayed images were not obtained in 1) (p less than 0.05) and all 11 had normal or only mildly decreased hepatocyte clearance (p less than 0.05). All five patients with obstruction secondary to pancreatitis had mild partial obstruction and normal or mildly decreased hepatocyte clearance. One patient had partial obstruction secondary to an abscess adjacent to the common bile duct; hepatocyte clearance was mildly decreased. Cancerous and noncancerous causes of biliary tract obstruction produce significantly different findings in heptobiliary imaging. (Author abstract) (12 Refs)

ENDOCRINE NEOPLASMS

5. SCINTIGRAPHIC THYROID ABNORMALITIES AFTER RADIATION. A CONTROLLED STUDY WITH 99MTCPERTECHNETATE SCANNING.

Gonzalez-Villalpando C, Frohman LA, Bekerman C, Favus MJ, Pinsky S, Ryo UY, Shore-Freedman E, Schneider AB
(c/o Schneider) Dept. Medicine, Michael Reese Hospital, 2900 South Ellis Ave., Chicago, IL, 60616
Ann Intern Med; 97(1):55-58 1982

We did 99mTcpertechnetate thyroid scintigraphy on 99 subjects with no history of therapeutic irradiation to the head or neck. They were compared with 198 irradiated patients selected from a group of over 1,700 who were evaluated because of radiation treatment for benign head and neck conditions during childhood. The two groups were similar with respect to age and sex distribution. There were significantly more abnormal scintigrams in the irradiated group (55 of 198 patients versus 1 of 99 controls). Even after patients and controls with palpable nodules were excluded from the analysis there were still more abnormal scintigrams in the irradiated group (16 of 150 irradiated versus 1 of 97 control subjects). We conclude that thyroid nodules, including the smaller, nonpalpable nodules discovered by scintigraphy, are related to previous radiation therapy. For persons at substantial risk, such as those who received high-dose treatment (greater than 700 R) during childhood, the data support the use of screening scintigraphy, even with normal findings on palpation. (Author abstract) (13 Refs)

6. THALLIUM-201-CHLORIDE THYROID SCINTIGRAPHY TO EVALUATE BENIGN AND/OR MALIGNANT NODULES. USEFULNESS OF THE DELAYED SCAN.

Ochi H, Sawa H, Fukuda T, Inoue Y, Nakajima H, Maeda Y, Okamura T, Onoyama Y, Sugano S, Ohkita H, Tei Y, Kawino K, Kobayashi Y
Dept. Radiology, Osaka City Univ. Medical Sch., 1-Asahimachi, Abeno-ku, Osaka 545, Japan
Cancer; 50(2):236-240 1982

The purpose of this study is to evaluate benign and/or malignant thyroid tumors with 201Tl thyroid scan. We studied 76 cases of histologically verified thyroid tumors, all seen as cold nodules on the 123I thyroid scan. 201Tl thyroid scan was performed 5-15 min (early scan) and 3-5 hr (delayed scan) after iv administration of 1.5-2.0 mCi of 201Tl. In 35 (94.6%) of 37 malignant tumors (anaplastic carcinoma, 6; papillary carcinoma, 23; follicular carcinoma, 5; epidermoid carcinoma, 1; malignant lymphoma, 1), 201Tl accumulated in the cold nodule of the 123I thyroid scan on both early and delayed scans. On the other hand, the delayed 201Tl scan was negative in 35 out of 39 (89.7%) benign tumors. Employing early and delayed 201Tl scans, we were able to differentiate most malignant thyroid tumors from those which were benign. False-negative and -positive cases are discussed. (Author abstract) (7 Refs)

7. SOLITARY THYROID NODULES IN CHILDREN AND ADOLESCENTS.

Hung W, August GP, Randolph JG, Schlagall RM, Chandra R
Children's Hosp. Natl. Medical Center, 111 Michigan Ave., N.W., Washington, DC, 20010
J Pediatr Surg; 17(3):225-229 1982

Thirty-nine children and adolescents with a solitary nodule of the thyroid gland were seen over a 16-yr period and 35 had their nodules removed surgically. All of the patients had preoperative thyroid scintiscans, of which 27 showed a cold nodule. The most common cause of solitary thyroid nodules was follicular adenoma. Five of the 27 cold nodules were malignant (18.5%) while no malignancies were present in the warm or hot nodules. Available diagnostic methods of attempting differentiation of benign from malignant solitary nodules are reviewed and an approach to the clinical management of such nodules as derived from our experience is presented. (Author abstract) (21 Refs)

8. SCINTIGRAPHY IN PHEOCHROMOCYTOMA.

Winterberg B, Fischer M, Vetter H
(c/o Vetter) Med. Poliklinik, d. Universitat, Domagkstr. 3, D-4400 Munster, W. Germany
Klin Wochenschr; 60(12):631-633 1982

In four patients with pheochromocytoma, scintigraphy with 131I-meta-iodobenzylguanidine was performed to localize hyperfunctioning adrenergic tissue. In three patients unilateral adrenal pheochromocytoma was found, whereas one patient with a malignant pheochromocytoma showed multilocular dissemination. The results document that scintigraphy with 131I-meta-iodobenzylguanidine seems to be a safe and reliable method of detecting adrenal and extra-adrenal pheochromocytomas, both benign and malignant. (Author abstract) (3 Refs)

GENITOURINARY NEOPLASMS

9. SERIAL RADIONUCLIDE IMAGING DURING TREATMENT OF PATIENTS WITH DIFFUSE BONE METASTASES FROM CARCINOMA OF THE PROSTATE.

Perkins AC, Hardy JG, Wastie ML, Clifford KM
Dept. Medical Physics, Queen's Medical Center, Nottingham NG7 2UH, England
Eur J Nucl Med; 7(7):322-323 1982

One hundred and thirty-two patients with histologically proven carcinoma of the prostate underwent radionuclide bone imaging (RBI). RBI was undertaken 3 hr after iv injection of 370 mega Becquerel 99mTc-labeled methylene diphosphonate. Seven patients exhibited a uniformly high bone uptake of the radionuclide prior to treatment. Radiographs showed widespread diffuse sclerosis of the bone in each patient and all the patients had normal renal function, as assessed by iv urography, blood urea, and creatinine levels. Follow-up studies were undertaken over periods of up to 14 mo, but the av duration of follow-up was only 9 mo. No significant changes were observed in the appearances of bone images on follow-up in three patients, but the initially uniform appearances of the images of the other four showed areas of relatively localized increased uptake. In some patients the sclerotic lesions became more focal, but no obvious correlation with changes seen in radionuclide images was observed. Significantly increased uptake of the tracer was observed in the lumbar and lower thoracic vertebrae of these patients on presentation. On follow-up there was a reduction in the bone uptake of the tracer. Focal uptake at 10 mo in T12 was less than the uptake at the site in the images of the patients at presentation. (9 Refs)

10. ABDOMINAL MASSES IN CHILDREN: MULTIORGAN IMAGING WITH 99MTC METHYLENE DIPHOSPHONATE.

Siddiqui AR, Cohen M, Moran DP
Dept. Radiology, Div. Nuclear Medicine, James Whitcomb Riley Hosp. for Children, Indiana Univ. Medical Center, Indianapolis, IN, 46223
AJR; 139(1):35-38 1982

Technetium-99m methylene diphosphonate (99mTc MDP) imaging was performed in 29 consecutive children with abdominal masses. Dynamic images of the inferior vena cava were obtained by injecting the radiotracer in the feet. Serial renal images were obtained for the next 30 min. Routine bone imaging was performed at about 3 hr. The radionuclide studies of the inferior vena cava accurately diagnosed total obstruction and displacement to the left but not partial obstruction and displacement to the right. The abnormalities on early renal imaging included displacement (14), distortion (7), obstruction (8), and nonvisualization (1). All patients with Wilms tumor (8) had either nonvisualized or distorted renal parenchyma. Patients with neuroblastoma (17) and other tumors (4) had displacement and obstruction. Soft-tissue accumulation of 99mTc MDP was noted in 2 Wilms' tumors and 12 neuroblastoma. (Author abstract) (15 Refs)

11. RENAL SCANNING PITFALLS IN THE DIAGNOSIS OF MASS LESIONS.

Webber MM, Cochran ST, Mitchell L
Dept. Radiological Sciences, Univ. California Los Angeles Sch. Medicine, Center Health Sciences, Los Angeles, CA, 90024
Clin Nucl Med; 7(7):327-330 1982

Renal scanning with Tc-99 DMSA has been reported to be an accurate method for distinguishing renal masses from normal variations. Two cases of error in diagnosis have come to our attention. The possible sources of error are discussed. (Author abstract) (4 Refs)

HEAD AND NECK NEOPLASMS

12. EVALUATION OF HEAD AND NECK TUMOURS BEFORE AND AFTER RADIOTHERAPY OF 40 GY USING GALLIUM-67-CITRATE. A PILOT STUDY.

Poublon RM
Ear, Nose, and Throat Dept., Univ. Hosp. Rotterdam, Dr. Molewaterplein 40, 3015 GD Rotterdam, The Netherlands
Clin Otolaryngol; 7(3):181-184 1982

Use of 67Ga-citrate as a method of determining tumor regression and treatment progress was investigated in 23 patients with head and neck cancer before and after radiotherapy (40 Gray). Only 9/28 could be assessed after radiotherapy. Five of seven scans corresponded to a clinically proven tumor regression, while two false negatives were noted. It was concluded that 67Ga scintigraphy has limited value in evaluating radiotherapy of patients with head and neck tumors, compared with other methods of investigation. (24 Refs)

13. MANDIBULAR INVOLVEMENT IN MALIGNANT DISEASE. ISOTOPE AND RADIOLOGICAL ASSESSMENT.

Barrellier P, Robillard J, Lecacheux B, Compere JF
Service de Stomatologie et de Chirurgie Maxillo-Faciale, Centre Becclere, Route de Lion-sur-Mer, F14021 Caen Cedex, France
Rev Stomatol Chir Maxillofac; 83(2/3):155-158 1982

Fifteen patients with gingival or juxtaosseous tumors with suspected mandibular involvement were subjected to x-ray examinations and pyrophosphate bone scanning. The findings of the two examinations were concordant in 10/15 patients, including negative findings in 2/10 patients, and discordant in 5/10: (the x-ray findings were positive and the scan was negative in 1/5 patients with mandibular involvement, and the x-ray findings were negative and the scans were positive in 3/5 patients with and in 1/5 without mandibular involvement). (no Refs) (In FRE)

14. VALUE OF ISOTOPE BONE SCAN IN THE DIAGNOSIS OF MAXILLOFACIAL DISORDERS.

Seguin P, Bezist JL, Champsaur A, Freidel M, Dumas P
Clinique de Chirurgie maxillo-faciale et stomatologie, Hopital E. Herriot, F 69003 Lyon, France
Rev Stomatol Chir Maxillofac; 83(2/3):159-162 1982

Six patients with maxillofacial affections (basal-cell epithelioma, metastases of breast cancer, primary centroosseous epithelioma, gingival neoplasm, histiocytosis X and pseudotumorous osteitis) were subjected to standard x-ray examination and isotope bone scanning. The x-ray findings were false negative in 3/6 cases and provided less relevant information than the bone scan in 2/6. The scintigraphic signs permit a better evaluation of pathological areas of bones, identify distant lesions, and provide early and more accurate information than standard x-ray. (6 Refs) (In FRE)

15. THE ROLE OF NUCLEAR SCANNING IN HEAD AND NECK SURGERY.

Pretorius D, Taylor A
(c/o Taylor) Dept. Radiology, Div. Nuclear Medicine, Univ. Utah Medical Center, Room 1C-409, Salt Lake City, UT, 84132
Head Neck Surg; 4(5):427-432 1982

Advantages and limitations of gallium-67 citrate scanning in localization of malignancy, technetium-99m pertechnetate scans in evaluating the salivary gland, iodine 123 or iodine 131 scans in evaluating thyroid function and detecting areas in which thyroid cancer is suspected, and bone scintigraphy in evaluating bone grafts and in screening for metastatic disease are discussed with respect to the head and neck surgeon's requirements. Occurrence rates of false-positive and false-negative results are considered. (26 Refs)

HEMATOLOGIC, RETICULOENDOTHELIAL, AND LYMPHATIC NEOPLASMS

16. VISUALIZATION OF SKELETAL MUSCLE INVOLVEMENT OF MYCOSIS FUNGOIDES ON 67GA SCINTIGRAPHY.

Shigeno C, Morita R, Fukunaga M, Tsuchiya K, Hino M, Hariuka T, Torizuka K
Dept. Nuclear Medicine, Kytoto Univ. Sch. Medicine, 54 Shogoin-kawara-machi, Kyoto 606, Japan
Eur J Nucl Med; 7(7):333-335 1982

An uncommon involvement of the skeletal muscle by mycosis fungoides detected by 67Ga-citrate scintigraphy in a 84-yr-old female is described. The patient developed generalized erythema 17 yr prior to the admission. The patient was successfully treated with corticosteroids and regional radiotherapy. For the following 15 yr the patient's condition had remained good until 2 mo prior to the admission. Diagnosis of mycosis fungoides was made by skin biopsy. The patient was treated with systemic chemotherapy and with regional radiotherapy. The patient's condition progressively deteriorated. The patient died of bronchopneumonia approx 6 wk after 67Ga scanning. Autopsy section from the left leg showed diffuse infiltration of malignant lymphomatous cells in all soft tissue components from the skin to the underlying calf muscle. (11 Refs)

MUSCULOSKELETAL NEOPLASMS

17. CLINICAL USE OF RADIONUCLIDE BONE IMAGING IN A UNIVERSITY MEDICAL CENTER.

Fihn SD, Larson EB, Rudd TR, Nelp WB
(c/o Larson) Dept. Medicine, RG-20, Univ. Washington, Seattle, WA, 98195
JAMA; 248(4):439-442 1982

To assess the diagnostic utility of radionuclide bone imaging, we reviewed all examinations performed during a 2-yr period in a university medical center. The indication(s) for each bone image and its interpretation were compared by reviewing requisition forms and medical records. Thirty-nine percent of 988 studies demonstrated relevant abnormalities. Yields of pertinent positive findings were greatest in patients with cancers of the breast (40%) and prostate (38%) and lowest in women with uterine cancer (15%), patients with previously normal bone images, and individuals with suspected but unconfirmed malignancy. Incidental findings, unrelated to the indication for imaging, occurred frequently (up to 41% of cases). We did not find a sizable number of negative studies that could readily be labeled as unnecessary, suggesting that bone imaging is generally a useful procedure as applied by physicians in this setting. (Author abstract) (20 Refs)

18. ABNORMALLY HIGH DIFFUSE ACTIVITY ON BONE SCINTIGRAM: THE IMPORTANCE OF EXPOSURE TIME FOR ITS RECOGNITION.

Fukuda T, Inoue Y, Ochi H, Nakazima H, Sawa H, Onoyama Y
Dept. Radiology, Osaka City Univ. Medical Sch., 1-Asahimachi, Abeno-ku, Osaka, 545, Japan
Eur J Nucl Med; 7(6):275-277 1982

Bone scintigrams were performed in a 64-yr-old man with prostatic carcinoma and in a 56-yr-old man and 58-yr-old woman with gastric carcinoma; the studies showed high diffuse skeletal activity. Scans were performed 3 hr after iv administration of 0.4 mCi/kg 99mTc-methylene diphosphonate. Clinically, all patients had high serum alkaline phosphatase (99.9-227.5 King-Armstrong units) and normal blood urea nitrogen and calcium. Bone scintigrams were taken with a preset count of 500,000; 50-60 sec were required to make an image, whereas in control patients (50 subjects without diffuse abnormal activity) 100-150 sec were needed. Renal images were faint but urinary bladder was well recognized, even immediately after urination. When an image is taken with a preset count in the face of high diffuse skeletal activity, the scintigram may be misdiagnosed as normal due to the lack of focal activity. Differential diagnosis is discussed. Secondary hyperparathyroidism can be distinguished from metastatic bone disease and myelofibrosis if the urinary bladder image is not visualized on bone scintigram. In the case of metastatic bone lesions, a mottled appearance may be noted in some areas. In secondary hyperparathyroidism, high activity is seen in the axial bones, perpendicular bones, calvarium, mandible, and hands. In myelofibrosis, bone-seeking agents accumulate in large quantities in the ribs, sternum, and iliac bone; activity in the spine is lower relative to that in secondary hyperparathyroidism and metastatic bone lesions. The present study illustrates that exposure time is important for objective differentiation between cases that show high diffuse skeletal activity and normal cases. (14 Refs)

19. RADIONUCLIDE BONE SCANNING OF OSTEOSARCOMA: FALSELY EXTENDED UPTAKE PATTERNS.

Chew FS, Hudson TM
(c/o Hudson) Dept. Radiology, Box J-374, Univ. Florida, J Hillis Miller Health Center, Gainesville, FL, 32610
AJR; 139(1):49-54 1982

The pathologic specimens of 18 osteosarcomas of long bones were examined to correlate histologic abnormalities seen on preoperative 99mTc pyrophosphate or methylene diphosphonate bone scans. Seven scans accurately represented the extent of the tumors. Eleven scans disclosed increased activity extending beyond the radiographic abnormalities. In eight of these, there was no occult tumor extension and in other three, the scan activity did not accurately portray the skip metastases that were present. Therefore, these 11 scans demonstrated the falsely extended pattern of uptake beyond the true limits of the tumors. Pathologic slides were available for 10 of the 11 areas of bone that exhibited extended uptake. In two instances, there was not pathologic abnormality. In the other eight cases we found marrow hyperemia, medullary reactive bone, or periosteal new bone. This is the first description of these histologic abnormalities of medullary bone in areas of extended uptake on radionuclide bone scans. (Author abstract) (16 Refs)

20. INTRA-OPERATIVE BONE SCANNING (MEETING ABSTRACT).

Colton CL, Hardy JG
No affiliation given
J Bone Joint Surg [Br]; 64(2):255 1982

Colton and Hardy said that the usefulness of a miniaturized, sterilizable gamma-radiation detector had been evaluated using osteoid osteoma as a bone tumor model. After the administration of technetium-99m diphosphonate two to three hours before the operation, the affected bone had been surgically exposed and the surface scanned to localize the site of maximal emission of gamma rays. The probe had been used in eight cases and in all had succeeded in localizing the tumor nidus accurately. In two cases involving the talus and one involving the femoral neck the technique had made localization easy where standard intra-operative radiological techniques would have been likely to have failed. In long bones accurate localization of the nidus had allowed for only minimal bone resection, greatly reducing the risk of fracture through the surgical defect. In all cases resection of the tumor nidus had been complete. (no Refs)

RESPIRATORY AND CARDIOVASCULAR NEOPLASMS

21. VENTILATION-PERFUSION MISMATCH IN TUMOR EMBOLISM.

Boudreau RJ, Lisbona R, Sheldon H
(c/o Lisbona) Dept. Nuclear Medicine, Royal Victoria Hosp., 687 Pine Ave. West, Montreal, Quebec H3A 1A1, Canada
Clin Nucl Med; 7(7):320-322 1982

An unusual case of extensive tumor embolism is reported in which the lung scan was instrumental in demonstrating the underlying pathophysiology. Pulmonary arteriography failed to demonstrate vessel occlusion and the need to perform this study with special care is re-emphasized. A brief review of the literature indicates that tumor embolism occurs much more frequently than is clinically suspected. (Author abstract) (5 Refs)

MISCELLANEOUS

22. THE SIGNIFICANCE OF FUNCTIONAL BONE MARROW SCINTIGRAPHY IN DIAGNOSIS OF TUMORS.

Munz D, Hor G
Abt. fur Allgemeine Nuklearmedizin, Zentrum der Radiologie, Univ. Frankfurt, Frankfurt, W. Germany
Verh Dtsch Ges Inn Med; (87):1106-1111 1981

Functional bone marrow scintigraphy was performed in 16 normal persons and 92 patients with tumors including plasmocytoma, Hodgkin's disease, non-Hodgkin's lymphoma, and bronchogenic carcinoma. Patients received pretreatment with perchlorate, followed by rapid iv injection of 10uCi 99mTc-labeled human serum albumin microspheres (99mTc-HSA-MM)/kg body wt. Radioactivity in the bone marrow, spleen, and liver was recorded by means of a gamma-camera and was analyzed by a data-processing system. The quality of the scintigrams using 99mTc-HSA-MM was high. The entire marrow, including rib and sternum marrow was depicted. Pathological

changes were detected in the marrow, spleen, and/or liver in 91% of tumor patients. Pathological conditions were found in the marrow in 87%, liver in 40%, and spleen in 36%. Marrow defects included storage defects in 75% and pathological distribution patterns in 66%. Pathological distributions included peripheral expansion (90%), displacement of the marrow from central areas to the periphery in 8%, and complete lack of visualization of the marrow in 2%. Results of bone and bone marrow scintigraphy were compared in 65 patients. Pathological findings were obtained in 66% of bone scintigrams and 88% of bone marrow scintigrams. Complete agreement of findings was obtained in 16% of patients and partial agreement in 77%. Analysis of the kinetics of metabolism of the microspheres allowed evaluation of the extent and activity of tumor growth. Functional bone marrow scintigraphy with 99mTc-HSA-MM is evidently a valuable tool for diagnosis of tumors. (8 Refs) (In GER)

23. LYMPHOSCINTIGRAPHY BY SC INJECTION OF 67GA-CITRATE.

Ito Y, Otsuka N, Nagai K, Muranaka A, Yoneda M, Terashima H, Yanagimoto S

Div. Nuclear Medicine, Kawasaki Medical Sch., Kurashiki, Okayama-ken 701-01, Japan

Eur J Nucl Med; 7(6):260-265 1982

Lymphoscintigraphy with sc 67Ga-citrate (200 uCi) demonstrated lymph nodes effectively in 15 patients with lymph node metastasis or malignant lymphoma. Use of 67Ga-scintigraphy is recommended 5 min to 1 hr after sc injection of 67Ga. The positive results corresponded well to cold lesions detected by lymphoscintigraphy with 99mTc-rhenium colloid in metastatic lymph nodes. Possible mechanisms of localization are binding of 67Ga tc transferrin in lymph and pinocytosis. A combination of colloid- and sc 67Ga-lymphoscintigraphy is suggested for diagnosis of lymph node disease. (9 Refs)

24. DOSIMETRY AND PRELIMINARY HUMAN STUDIES OF 18F-5-FLUOROURACIL.

Shani J, Young D, Schlesinger T, Siemsen JK, Chlebowski RT, Bateman JR, Wolf W

(c/o Wolf) Radiopharmacy Program, Sch. Pharmacy, Univ. Southern California, Los Angeles, CA, 90033

Int J Nucl Med Biol; 9(1):25-35 1982

The relative distribution, metabolism and kinetics of 18F containing compounds, following administration of 18F-5-fluorouracil, has been prognostic aid in predicting response to 5-fluorouracil chemotherapy. Because 18F has a relatively short physical half-life (t 1/2 = 110 min), and the distribution and kinetics of the radiolabeled 5-fluorouracil need to be studied over periods of time that range over several half-lives of the radionuclide, significant quantities of the labeled drug must be administered in order to obtain good counting statistics. The distribution of 18F, following injection of 18F-5-fluorouracil to rats and mice, has been well documented in our previous work. It appears that the distribution of 18F in humans, following administration of 18F-5-fluorouracil is similar to that in rats. We calculated the radiation dose according to the MIRD technique for the eleven main target organs for a reference man. The critical organs, according to these calculations, are the bladder wall, the kidney and the liver, receiving a radiation dose of 729, 184 and 114 mrad per mCi injected, respectively. (Author abstract) (12 Refs)

SELECTED PRE-CLINICAL STUDIES

25. SUBCELLULAR DISTRIBUTION OF GALLIUM-67 IN TUMOR AND LIVER.

Ando A, Ando I, Takeshita M, Hiraki T, Hisada K

Sch. Paramedicine, Kanazawa Univ., 5-11-80 Kodatsuno Kanazawa City 920, Japan

Int J Nucl Med Biol; 9(1):65-69 1982

The distribution of 67Ga was determined by subcellular fractionation of transplanted tumor tissues in rats and mice. Donryu rats had Yoshida sarcoma and hepatoma AH109A implanted sc while ddY mice had Ehrlich tumor implanted sc. Carrier-free 67Ga-citrate (10 uCi/0.4 ml water) was injected iv into the rats and ip into the mice. At 10 min, 1 hr, 3 hr, 24 hr, and 48 hr after administration of 67Ga-citrate, tumor tissue and livers were excised and analyzed. In animals with Yoshida sarcoma and Ehrlich tumor, most of the radioactivity was localized in the supernatant fraction (SF), while little activity was observed in the mitochondrial (MF), nuclear, and microsomal fractions. In the livers of rats and mice, the radioactivity of the MF increased with time after administration of 67Ga-citrate. Radioactivity of the SF decreased with time. For hepatoma AH109A, radioactivity of the MF increased with time until 24 hr after administration while that of the SF decreased with time in the same time period. With Ehrlich tumor, host liver, and hepatoma AH109A, 67Ga was transposed from the SF to the MF; this occurred readily in the liver and only slightly in the Ehrlich tumor. In the tumors, greater amounts of protein was in the SF, and 8.2-13.7% of total protein was in the MF. In livers, more protein was in the SF, with 23.5-24.9% in the MF. In Yoshida sarcoma and Ehrlich tumor, relative specific activities in microsomal fraction was higher than those in the SF, while in hepatoma AH109A, relative specific activity in the mitochondrial fraction increased with time and that in the SF decreased. It was concluded that the lysosome does not have a major role in the tumor concentration of 67Ga, but may have a major role in liver and hepatoma AH109A concentration. (12 Refs)

26. IN VITRO AND IN VIVO EFFECTS OF FERRIC CITRATE ON 67GA-CITRATE UPTAKE BY DS SARCOMA TUMORS.

Angélleri LJ, Thouvenot P, Brunotte F, Marchal C, Robert J

Service de Medicine Nucleaire, Univ. Nancy, 18, rue Lionnois, F-54000 Nancy, France

Eur J Nucl Med; 7(6):266-268 1982

In vitro and in vivo effects of ferric citrate on 67Ga-citrate uptake in experimental DS sarcomas were investigated. Solid tumors were induced by sc injection of 3 x 10(7) viable DS sarcoma cells into the dorsal region of Sprague-Dawley rats; tumors were studied 2 wk later. Tumor-bearing animals were injected with 150 uCi 67Ga-citrate plus carrier ferric citrate. 67Ga-citrate uptake by various tissues was studied 24 and 48 hr later. Ferric citrate was strongly inhibitory, particularly in muscle and tumor tissue; 48 hr after radioactivity injection the decreases in radioactive accumulation were 90% and 75% of the control group, respectively. Other tissues showed a less significant decrease in uptake; bone showed a slight increase. Blood showed only a 40% decrease of radioactivity after 48 hr. In vitro studies involved incubation of DS sarcoma cell suspension with 1 uCi 59Fe-citrate and 1 uCi 67Ga-citrate for 1hr at 37 C, followed by centrifugation, washing, and counting for radioactivity. Effects of transferrin on 59Fe and 67Ga uptake by tumor cells were assayed using 0.1, 0.25, and 0.5 milliM

ferric citrate, 16 mg human transferrin, and 1 ml DS sarcoma cell suspension. With increasing ferric citrate concentrations up to approx 0.5 milliM, uptake of 59Fe and 67Ga increased. Thereafter, uptake decreased sharply. Gallium mimicked iron; the uptake of both cations was inhibited by transferrin, suggesting that the formation of metal-transferrin complexes makes the cation unavailable for transport into the cell. The different behaviors of tumor tissue and blood suggest different binding site characteristics in each case. (10 Refs)

27. GALLIUM-67 DISTRIBUTION AND WHOLE BODY RETENTION IN METHOTREXATE TREATED RATS.

Dansereau RN
Purdue University, Lafayette, IN
Diss Abstr Int [B]; 42(8):3203-B 1982

Gallium-67 citrate is a radiopharmaceutical which localizes in tumors, abscesses, and inflammatory lesions. It is believed that the iron-binding protein transferrin is required for the transport of gallium-67 to the site of localization. Since transferrin is synthesized primarily in the liver and treatment with methotrexate may be hepatotoxic, an alteration in the distribution and whole body retention of gallium-67 may occur from chronic treatment with methotrexate. To test this hypothesis, methotrexate was administered intraperitoneally at a dose of 250 ug/kg per day for five days each week for up to 3 weeks. Small decreases in gallium-67 levels were observed in blood, spleen, and muscle of drug-treated animals in relation to normal saline controls. Although small in magnitude, gallium-67 whole body elimination was more rapid in drug-treated animals than controls after two or three weeks of methotrexate treatment. The study showed no effect of methotrexate treatment on the unbound iron-binding capacity or total iron-binding capacity of transferrin or serum iron. The results of the investigation infer that alterations in the biodistribution and retention of gallium-67 from methotrexate treatment may not be of clinical significance. (no Refs)

28. HISTOAUTORADIOGRAPHY IN EVALUATION OF TUMOR-SEEKING PROPERTIES OF RADIONUCLIDES.

Kindzel'skii LP, Mechev DS, Atamaniuk NP, Arungaxyeva VV
Res. Roentgenoradiological and Oncological Inst., Kiev, USSR
Med Radiol (Mosk); 27(5):15-20 1982

Tumor-seeking properties of various radionuclides were studied in random-bred male rats bearing implanted sarcoma 45 (spindle cell sarcoma), Guerin carcinoma (poorly differentiated uterine carcinoma), or hepatoma 27 (poorly differentiated liver tumor). The tumor-bearing animals were inoculated with 111In-citrate, 111In-bleomycin, 67Ga-citrate, 99mTc-citrate, or 99mTc-pertechnetate; 4-24 hr after radionuclide administration, the animals were sacrificed, and specimens of tumor and normal tissue were subjected to histoautoradiographic analysis. Comparative evaluation of tumor-muscle, tumor-blood, and tumor-liver coefficients for the five radionuclides tested showed that all except the 99mTc-citrate met the requirement of selective accumulation. Gallium and indium compounds were more effective in visualization of tumors located above the diaphragm, while 99mTc-pertechnetate was more effective in visualization of tumors located below the diaphragm. (7 Refs) (In RUS)

29. POTENTIAL APPLICATIONS OF RADIONUCLIDE-LABELLED LIPOSOMES IN THE DETECTION OF THE LYMPHATIC SPREAD OF CANCER.

Osborne MP, Richardson VJ, Jeyasingh K, Ryman BE
Dept. surgery, Memorial Sloan-Kettering Cancer Center, 1275 York Ave., New York, NY, 10021
Int J Nucl Med Biol; 9(1):47-51 1982

External gamma-camera imaging and tissue radioassay were used to study regional lymph node localization of 99mTc-labeled liposomes in Rd/3 tumor-bearing rats following interstitial injection. The findings suggest that radiolabeled liposomes may be useful for diagnosis of lymphatic spread of cancer and may be of value as an in vivo test of immunological function in regional lymph nodes. Labeled cationic liposomes showed a less marked suppression of uptake by lymph nodes containing metastases, suggesting targetting of 99mTc-labeled cationic liposomes as a therapeutic carrier to diseased lymph nodes. (8 Refs)

30. IN VIVO LOCALIZATION OF ANTI-OSTEOGENIC SARCOMA 791T MONOCLONAL ANTIBODY IN OSTEOGENIC SARCOMA XENOGRAFTS.

Pimm MV, Embleton MJ, Perkins AC, Price MR, Robins RA, Robinson GR, Baldwin RW
Cancer Res. Campaign Lab., Univ. Nottingham, Nottingham, NG7 2RD, England
Int J Cancer; 30(1):75-85 1982

Monoclonal antibody 791T/36, (mouse IgG2b) to the human osteogenic sarcoma 791T was isolated from hybridoma supernatants or ascites fluid and labelled with radioiodine. Following injection into immuno-deprived CBA mice with subcutaneous xenografts of human osteogenic sarcomas 791T, 788T and 20s, reactive antibody was detectable in the circulation and there was a preferential uptake into tumor tissue compared with muscle, bone or visceral organs. The tumor uptake of radioactivity correlated with the size of the xenograft, up to 20% of the total body counts being within the tumor. Autoradiography of tissue sections showed activity mainly within the subcapsular regions of the xenografts. There was no tumor localization of radio-labeled normal IgG. Furthermore, with a colon carcinoma and a bladder carcinoma, both unreactive with the 791T/36 antibody, there was no localization of radiolabeled antibody in xenograft growths. With 791T/36 monoclonal antibody labeled with 131I localization into 791T xenografts could be visualized by whole-body gamma scintigraphy with computerized 99mTc-pertechnetate or 113mIn-indium chloride-labeled blood pool subtraction. These studies demonstrate the potential of monoclonal antibody to a human tumor for in vivo localization both for diagnostic purposes and as a carrier for therapeutic agents. (Author abstract) (28 Refs)

31. GUT REACTIONS OF RADIOACTIVE NITRITE AFTER INTRATRACHEAL ADMINISTRATION IN MICE.

Thayer JR, Chasko JH, Swartz LA, Parks NJ
(c/o Parks) Lab. Energy-Related Health Res., Univ. California, Davis, CA, 95616
Science; 217(4555):151-153 1982

Intratracheal administration to mice of radioactive nitrite labeled with nitrogen-13 (13NO2-) (half-life, 9.96 minutes) in dosages that do not cause pharmacological perturbation reveals that oxidative and reductive reactions occur in different organs. Oxidation of 13NO2-to radioactive nitrate (13NO3-) predominates in the blood and liver. Reduction of 13NO2- occurs in those mice that harbor intestinal microflora; this re-

duction does not occur in germ-free mice. The intestinal reduction products include ammonium, glutamate, glutamine, and urea. With a detection limit of about 0.01% of the instilled nitrogen-13, no labeled nitrosamines were detected within 30 minutes. Reduced nitrogen-13 is transported out of the intestine into the circulatory system and appears in the urine along with 13NO3-. The biological half-period for 13NO2-destruction is about 7 minutes, and both oxidation and reduction products are formed. (Author abstract) (37 Refs)

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ON CURRENT TOPICS IN CANCER RESEARCH

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CANCER DETECTION AND MANAGEMENT

Nuclear Medicine

SERIES CT02 No. 82/12 DECEMBER, 1982

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BREAST NEOPLASMS

1. BONE SCANNING AS A ROUTINE EXAMINATION OF PATIENTS WITH MAMMARY CARCINOMA; CRITICAL CONSIDERATIONS.

Heslinga JM, Pauwels EKJ, Zwaveling A
Heelkundige Kliniek, Academisch Ziekenhuis, Leiden, The Netherlands

Ned Tijdschr Geneeskd; 126(23):1036-1039 1982

One hundred and thirty-six women with breast cancer were subjected to preoperative routine bone scanning to detect skeletal metastases. Eighty-one of the 136 patients were in Columbia Stage A (median age 62 yr), 55 in Stage B/C (median age 67 yr). The scintigraphic findings were correct positive in 4/136 patients, all in Stage B/C, and false positive in eight (5/8 in Stage A and 3/8 in B/C). Fifteen of the 132 patients with negative preoperative scintigraphic findings developed skeletal metastases during the first 2 yr after surgery: 8/15 were in Stage A and 7/15 in B/C. Six of the 132 patients developed skeletal metastases 2-4 yr after surgery: 2/6 were in Stage A and 4/6 in B/C. Most of the patients with correct positive bone scans also displayed other signs of skeletal metastasis at

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the same time (ostealgia and increased serum alkaline phosphatase level). In view of the low incidence of skeletal metastases preoperatively and the presence of other signs of metastases routine bone scanning of breast cancer patients was abandoned both preoperatively and during the follow-up period. Bone scanning should be performed only on the basis of anamnestic date, and physical and laboratory findings. (23 Refs) (In DUT)

2. RADIATION THERAPY PLANNING BASED ON PARASTERNAL LYMPHOSCINTIGRAPHY IN PATIENTS WITH BREAST CANCER.

Ohtake E
Dept. Nuclear Medicine and Radiological Sciences, Tokyo Metropolitan Geriatric Hosp., Tokyo, Japan
Nippon Igaku Hoshasen Gakkai Zasshi; 42(3):288-302 1982

Planning parasternal lymph node radiotherapy was studied in 24 breast cancer patients (women; 26-76 yr old) with autopsy-verified lymph nodes. Simple mastectomy had been performed in 2 of the patients and radical mastectomy in 21. Parasternal lymphoscintigraphy was performed in all of the patients 4 hr after bilateral subcostal injection of 99mTc-sulfur colloid or 99mTc-antimony sulfide colloid. Location of the lymph nodes was observed with the aid of a conventional parallel hole collimator and a bilateral collimator. The width between the right and left parasternal lymph nodes was 5.6 +-1.0 cm (range 4.1-7.7 cm), and the lateral distance from the center of the sternum to the lymph nodes was 2.3 +-0.8 cm (range 0.7-5.2 cm); the lateral distance tended to be wider on the right side than on the left. The depth of the lymph nodes from the body surface was 2.3 +-0.7 cm (range 0.9-4.3 cm), and the depth of the lymph nodes increased with respect to the degree of obesity of the person. Retrospective study indicated that 59% of the parasternal lymph nodes were within the radiation field and 19% of the lymph nodes were seated within 1 cm of the intended depth of radiation penetration. This suggested that parasternal lymphoscintigraphy might be performed prior to radiotherapy to determine the location and depth of the parasternal lymph nodes. (56 Refs) (In JPN)

CENTRAL NERVOUS SYSTEM NEOPLASMS

3. IMAGING OF BRAIN TUMORS AFTER ADMINISTRATION OF L-(N-13)GLUTAMATE: CONCISE COMMUNICATION.

Reiman RE, Benua RS, Gelbard AS, Allen JC, Vomero JJ, Laughlin JS
Biophysics Lab., Memorial Sloan-Kettering Cancer Center, 1275 York Ave., New York, NY, 10021
J Nucl Med; 23(8):682-687 1982

Cyclotron-produced L-(N-13)glutamate was used to visualize malignant intracranial tumors in 12 pediatric patients who had evidence of recurrent disease as documented by computed transaxial tomography (TCT). Imaging was performed using a rectilinear scanner, gamma camera, or a positron-emission tomograph (PET). The results indicate that N-13 is rapidly taken up by a majority of brain tumors following the administration of L-(N-13)glutamate, and that N-13 uptake is correlated with breakdown of the blood-brain barrier as demonstrated by contrast TCT or pertechnetate (Tc-99m) studies. The feasibility of using this agent in conjunction with PET is established. (Author abstract) (13 Refs)

4. CEREBRAL SCINTIGRAPHY IN THE DIAGNOSIS OF POSTOPERATIVE RECURRENCE OF INTRACRANIAL TUMORS.

Tian J, Liu F, Wang L, Chen G, Zhang Y, Fu C, Yin D, Xu F
Dept. Isotopes, PLA General Hosp., Beijing, People's Republic of China
Zhonghua Fangshexue Zazhi; 16(1):66-70 1982

Of 14 patients undergoing brain scintigraphy, 11 (9 males, 2 females, aged 5 to 56) were confirmed by surgery, cerebroangiography and other clinical tests to have recurrent brain tumors. Among these 11 patients, recurrent symptoms were positive in 6, negative in 3, and ambiguous in 2. Within 6 mo after scintigraphy the six patients with positive symptoms were confirmed by surgery to have recurrent tumors. The three patients with negative symptoms still showed no abnormality after more than 2 yr of clinical observation and tests. The two patients with ambiguous symptoms did not yet show radioactive dots in the deep area; even with cerebroangiography 1/2 showed no recurrence after more than 2 yr of observations. (8 Refs) (In CHI)

5. CLINICAL NMR IMAGING OF THE BRAIN: 140 CASES.

Bydder GM, Steiner RE, Young IR, Hall AS, Thomas DJ, Marshall J, Pallis CA, Legg NJ
(c/o Steiner) Dept. Diagnostic Radiology, Royal Postgraduate Medical Sch., Du Cane Road, London W12 OHS, England
AJR; 139(2):215-236 1982

Cranial nuclear magnetic resonance (NMR) scans were performed on 13 healthy volunteers and 140 patients with a broad spectrum of neurologic disease and compared with x-ray computed tomography (CT) scans. The NMR scans included a variety of sequences reflecting proton density, blood flow, T1, and T2 as well as transverse, sagittal, and coronal images. White matter, gray matter, and cerebrospinal fluid were clearly distinguished in the normal brain with inversion-recovery (IR) sequences, and normal progressive myelination was demonstrated in infants and children. Acute hemorrhages displayed short T1 values, but other pathologic processes were associated with long T1 values. Cysts had very long T1 values. Spin-echo (SE) sequences showed increased values of T2 in a variety of conditions and highlighted lesions against the relatively featureless background of the remaining brain. With inversion-recovery scans, different stages of infarction were recognized in the hemispheres. NMR was more useful than CT in demonstrating brainstem infarction. The white matter lesions in demyelinating diseases were well demonstrated with NMR scans. Benign tumors were well seen and usually had shorter T1 values than malignant tumors. Mass effects from tumors were generally better demonstrated with NMR than with CT, including more subtle mass effects such as displacement of the external capsule. Abnormalities were seen in diseases of the basal ganglia, including marked atrophy of the head of the caudate nucleus in Huntington chorea. Advantages of NMR imaging include the high level of gray-white matter contrast, lack of bone artifact, variety of possible sequences, transverse, sagittal, and coronal imaging, sensitivity to pathologic change, and lack of known hazard. Disadvantages include lack of bone detail, limited spatial resolution, lack of contrast agents, and cost. NMR seems to be a potentially important addition to existing techniques of neurologic diagnosis. (44 Refs)

6. NUCLEAR MAGNETIC RESONANCE (NMR) IMAGING OF INTRACRANIAL NEOPLASMS: IN VIVO MEASUREMENTS OF T1 AND MOBILE PROTON DENSITY (MEETING ABSTRACT).

Brady TJ, Buonanno FS, Pykett IL, Hinshaw WS, Goldman MR, Pohost GM, Kistler JP
No affiliation given
Neurology; 38(4,part2):A155 1982

Proton NMR imaging permits the creation of tomographic maps of the NMR parameters, mobile proton density, and T1 relaxation time. By region-of-interest selection, measurements of those parameters can be made from discrete volumes of the image plane. We have applied such techniques to the study of human cerebral neoplasia, cerebral abscess, postoperative changes, and radiation necrosis. NMR imaging exhibited a high sensitivity in detecting lesions in the six representative patients reported. In all six patients, the specificity of NMR imaging was low since all abnormal areas appeared as lesions darker than surrounding normal brain, reflecting a decreased proton density, prolonged T1 values, or both. T1 relaxation times were prolonged (125 to 175% of normal) in the three patients with glioma, meningioma, and metastatic breast carcinoma; however, absolute T1 values overlapped with those found in abscess, edema, or radiation necrosis. Although T1 prolongation has often been attributed to, among other things, increased water content, the in vivo proton density values in our patients showed no correlation to T1, since proton density varied between 72 and 107% of values in matched, normal areas of brain in the same patients. (no Refs)

DIGESTIVE NEOPLASMS

7. LIVER SCINTIGRAPHY IN COLON CARCINOMA: CORRELATION WITH MODIFIED DUKE'S PATHOLOGIC CLASSIFICATION (MEETING ABSTRACT).

Tanasescu D, Brachman M, Drickman M, Ramanna L, Berman D, Waisman J, Waxman A
Cedars-Sinai Medical Center, Los Angeles, CA
J Nucl Med; 23(5):19 1982

The purpose of this study was to evaluate hepatic scintigraphy and selected tumor markers in predicting the presence of liver metastasis and regional lymph node involvement in patients (pts) with colon carcinoma (CCA). Ninety-two pts with CCA underwent Tc-99m sulfur colloid liver scintigraphy using a high resolution Anger camera. Multiple views with a minimum 750 counts were obtained. All pts had surgery with tumor biopsy, intraoperative examination of the liver, and serum alkaline phosphatase (Alk P) determinations. Carcinoembryonic antigen (CEA) levels were obtained in 36 pts. Of 89 pts with primary disease, 23 had abnormal scans. Sensitivity of hepatic scintigraphy was 96% with a specificity of 92%. In 84 pts, scan correlation with Duke's classification was made. Twenty-seven percent of the pts with normal liver scan had tumor in regional lymph nodes and 1.7% had hepatic metastasis. Sixty-three percent of pts with abdominal lymph node involvement had space occupying lesions on liver scan while 4.6% of pts without lymph node involvement had positive scans. Ninety-one percent of pts with positive liver scans had positive abdominal nodes. Alk P determination was associated with a false-positive rate of 13% and a false-negative rate of 20%. CEA levels were normal in 58% of pts. (no Refs)

8. TUMOR RADIOIMMUNODETECTION WITH ANTIBODIES TO COLON-SPECIFIC ANTIGEN-P (CSAP) (MEETING ABSTRACT).

DeLand FH, Shochat D, Bennett SJ, Nelson MO, Goldenberg DM
University of Kentucky, Lexington, KY
J Nucl Med; 23(5):8 1982

CSAp is recently identified human tumor-associated antigen relatively restricted to colorectal carcinomas. Previous animal studies indicated that radioactive CSAp antibodies prepared in goats have a significant and selective accretion in transplantable human colonic carcinomas producing CSAp. Clinical studies were undertaken with 131-I-labeled goat anti-CSAp IgG, particularly since the animal studies indicated a superiority for radioimmunodetection of CSAp antibodies over antibodies made against carcinoembryonic antigen. To date six patients (five with colorectal cancer and one with an unknown primary tumor) have been examined by external gamma scintigraphy following IV administration of 131-I-labeled goat anti-CSAp IgG. Tumors were detected in all patients, three of whom had negative studies by other imaging modalities. Although a cytoplasmic marker, CSAp has proven to be a very promising target for radioactive antibodies, thus revealing sites tumor containing the antigen. (no Refs)

9. PHOTOSCANNING LOCALIZATION OF HUMAN TUMORS USING RADIOIODINATED MONOCLONAL ANTIBODIES TO COLORECTAL CARCINOMA (MEETING ABSTRACT).

Chatal JF, Saccavini JC, Fumoleau P, Bardy A, Douillard JY, Aubry J, Le Mevel B
No affiliation given
J Nucl Med; 23(5):8 1982

In 1979, Herlyn et al reported production of hybridomas secreting monoclonal antibodies binding to human gastrointestinal carcinoma cells and not to normal colonic mucosa and human maligant cells of other origin. One of these antibodies, (17-1A) has been labeled with I-131 (chloramine T method). Photoscanning was performed 24h, 4 days and, in some cases, 7 to 12 days after injection of 1 to 2 mCi in 29 patients including 17 colorectal carcinomas and 12 cancers of other origin. Forty sites were explored and presence of absence of tumors determined by conventional methods. Best imaging was observed in late photoscannings (greater than 4 days). Results were positive in 17 sites out of 21 confirmed colorectal carcinoma (3 primary, 3 local recurrences and 11 liver and/or lung metastases). In some cases scintigraphic contrast of positive images was rather low, making interpretation more difficult and justifying computerized subtraction. Photoscanning was negative in 2 nonepitheliomatous colonic localizations, in 2 sites of suspected but not confirmed malignant recurrence and in 15 sites of noncolonic malignant tumors. Radioactive concentration measured on tumor and other tissue fragments 7 days after injection was 3 to 4 times greater in colonic tumor than in adjacent normal tissues and blood. (1 Ref)

10. THE PROSPECT OF DRUG DISTRIBUTION TO HEPATIC CANCER IN INTRA-ARTERIAL INFUSION CHEMOTHERAPY: EXAMINATION BY INFUSION OF 81MKR AND 133XE VIA CATHETER INTO THE HEPATIC ARTERY.

Sasaki Y, Imaoka S, Matsui Y, Ishikawa O, Taniguchi K, Iwanaga T, Terasawa T, Hasegawa Y, Nakano S
Dept. Surgery, The Center for Adult Diseases, Osaka, Japan
Nippon Gan Chiryo Gakkai Shi; 17(3):745-751 1982

Dynamic and quantitative distribution of drugs delivered in to hepatic cancers and surrounding tissues was estimated in nine patients (men; 40-70 yr old) with non-resectable hepatocellular cancers (8/9) or cholangio-cellular cancer (1/9) using 81mKr and 133Xe. The 81mKr was used as the model for continuous ia infusion chemotherapy and the 133Xe for the model of one-shot bolus administration. Sequential scintigrams were performed with the aid of a gamma camera and time activity curves were generated for the tumor and non-tumor areas of the liver. Higher radioactivities of both 81mKR and 133Xe were observed in the tumor than in the non-tumor areas in 7/8 patients with hepatocellular cancer, suggesting a higher arterial blood flow in tumor than non-tumor areas. Patterns of 81mKr distribution differed according to the position of the patient, suggesting that the most effective method of infusion could be chosen with the aid of this method. (16 Refs) (In JPN)

11. RADIOGRAPHIC AND RADIOISOTOPE EXAMINATIONS IN OBSTRUCTIVE JAUNDICE.

Danielian GA, Khanbabian BB, Adamian AA, Khachatrian VA
Dept. Radiography and Medical Radiology, Medical Inst., Erevan, USSR
Zh Eksp Klin Med; 22(2):140-146 1982

Diagnostic efficacy of conventional radiography and radioisotope scintigraphy was evaluated in 28 patients (10 men, 18 women; 27-58 yr old) with obstructive jaundice. Cholecystography and cholecystocholangiography showed cholelithiasis in 18 patients. Duodenography and parietography in combination with tomography showed cancer of the head of the pancreas in eight patients, cancer of the Vater's ampulla in one, and stomach cancer with metastases to the periportal lymph nodes in one. (12 Refs) (In RUS)

ENDOCRINE NEOPLASMS

12. THE SURVEILLANCE OF DIFFERENTIATED CANCERS OF THE THYROID IN THE ADULT.

Speich PV, Couturier M, Mollet E, Bidet R
Servoce de Medicine Nucleaire, C.H.U. Besancon, 2, place Saint-Jacques, 25030 Besancon, France
J Biophys Med Nucl; 6(1):3-7 1982

A follow-up protocol for patients having undergone complete removal of the thyroid for cancer is proposed. Total thyroidectomy is followed by one or several therapeutic doses of 131-I in order to assure destruction of all thyroid tissue. Contraindications to therapeutic doses of 131-I are determined primarily on the level of irradiation which is a function of the amount of tracer that is captured by the thyroid tissue and is concentrated in the plasma. In order to use scintigraphy in the monitoring of the patient postoperatively, 131-I is used diagnostically to permit the evaluation of the remaining tumor tissue and to determine the therapeutic dose which should be delivered. Any suspicion that is raised following total scaning must be followed by a new therapeutic dose of 131-I, followed by another post-therapeutic scanning 2 and 5 days later. A general check-up is then performed 3 mo later. Long-term follow-up is recommended because thyroid cancer related deaths stabilize only about 15 yr following the original therapy, and late occurring metastases have been reported. (29 Refs) (In FRE)

13. TREATMENT RATIONALE IN THYROID CARCINOMA: EFFECT OF SCAN DOSE (MEETING ABSTRACT).

Ramanna L, Waxman N, Chapman N, Brachman M, Tanasescu D, Berman D, Chapman D, Braunstein G
Cedars-Sinai Medical Center, Los Angeles, CA
J Nucl Med; 23(5):43 1982

We have found that 10 mCi diagnostic I-131 scans are significantly more sensitive than 2 mCi scans in the follow-up of thyroid cancer patients (pts). The purpose of this study was to evaluate the therapeutic response to I-131 in those individuals with negative (-) 2 mCi and positive (+) 10 mCi diagnostic scans. Ten pts with thyroid carcinoma were treated with I-131 and rescanned in six months using 2 mCi and 10 mCi I-131 diagnostic doses. All pts had + 10 mCi scans but -2 mCi studies using an endogenous TSH (thyroid stimulating hormone) stimulation protocol. Therapeutic I-131 doses of 100 mCi (8 pts) and 30 mCi (2 pts) were administered. Thyroid scans were again obtained in 6 months using an identical protocol. Ablation on the 10 mCi scan was achieved in 3 pts (30%) following the previous I-131 therapy. Since -2 mCi, + 10 mCi pts imply a low uptake, sufficient uptake of I-131 to deliver ablative doses may not be present to warrant therapy in this population. The data suggests a need to redefine ablation in clinical rather than visual terms. A 10 mCi scan provides information with respect to extent of disease but by itself lacks predictive information for successful treatment. (1 Ref)

14. CLINICAL VALUE OF THYROGLOBULIN (HTG) RIA IN FOLLOW-UP OF DIFFERENTIATED THYROID CARCINOMA (MEETING ABSTRACT).

Bottger I, Kanitz W, Pabst HW
Nuclearmedicine Clinic and Policlinic, Technical University Munich, Munich, W. Germany
J Nucl Med; 23(5):97 1982

Interference by endogenous hTg antibodies, TSH (thyroid stimulating hormone) induced hTg stimulation and recent reports of false negative/positive results are parts of an ongoing controversy of the hTg RIA's (radioimmunoassays) clinical value being reassessed in this study. All patients investigated had undergone total thyroidectomy and subsequent radioiodine therapy for differentiated thyroid carcinoma. A recovery was done in each serum by addition of 80 ug hTg. Radioiodine whole body scans were performed with 1-2 mCi I-131. HTg antibodies were found in 7%, 7 of these 11 sera demonstrating an unacceptable hTg recover of worse than +/-50%. Four hundred and thirty-three sera without detectable antibodies showed recoveries of up to +/-15% in 62%, +/-16-30% in 19%, +/-31-50% in 9% and worse that +/-50% in 10%. Twelve sera without detectable antibodies, with a recovery of better than +/-50% in 7 and hTg levels between 96 and 378 ug/l consistenting revealed higher hTg concentrations on 1:5 and 1:10 dilution with 0 hTg standard. TSH-induced hTg stimulation could only be observed in 4 of 31 patients without but in 7 of 11 with metastases, which, however, did not affect the diagnosis. There were only one questionably false negative and 3 false positive hTg determinations in 30 patients with and 32

without metastases being opposed by 7 false negative radioiodine whole-body scans. (no Refs)

15. THE KINETICS OF THALLIUM 201 UPTAKES IN THYROID CARCINOMA (MEETING ABSTRACT).

Tennvall J, Palmer J, Cederquist E, Akerman M
University Hospital, Lund, Sweden
Third European Symposium on Radiopharmacology, April 23-24, 1982, Noordwijkerhout, The Netherlands Society of Nuclear Medicine Europe; 1982

In a study of 100 patients in whom the final diagnosis was established by histology, we have investigated the potential of Thallium-201 for increasing the specificity of tumor detection. The retention kinetics were evaluated in 36 consecutive patients. Sequential imaging was performed the first 40 minutes after injection of Thallium-201. Curves of activity were generated from apparently pathological and normal regions of the thyroid in each patient and the relative uptake and disappearance rate were calculated. The turnover was in general decreased for pathological tissues. Cancer as a group was distinguished statistically from benign lesions only by the relative disappearance rate. A low uptake is typical for non malignant tissue. When the lesion shows accumulation of Thallium and in particular if the relative half life is long a well differentiated cancer must be considered. (no Refs)

16. RADIONUCLIDE BONE AND LIVER SCANNING IN PATIENTS WITH MEDULLARY CARCINOMA OF THE THYROID GLAND (MEETING ABSTRACT).

Johnson DG, Coleman RE, McCook TA, Dale JK, Wells SA
Duke University Medical Center, Durham, NC
J Nucl Med; 23(5):20 1982

The purpose of this study was to determine the results of radionuclide bone and liver scans in patients with medullary carcinoma of the thyroid gland (MCT), an uncommon malignancy known for early metastases. Thirty-four patients with surgically proven MCT and elevated serum thyrocalcitonin levels had technetium-99m medronate bone and/or sulfur colloid liver scans for suspected metastases. Liver scans were available in 32 patients and bone scans in 30 patients. Skeletal radiographs were available in 16 patients who had bone scans. Liver scans demonstrated focal metastatic lesions in nine of 32 patients. Eight were hepatic and one was splenic. Bone scans were positive for metastases in 9 of 30 patients. Five of these 9 patients demonstrated only skeletal lesions; 2 demonstrated only the presence of Tc-99m medronate uptake within hepatic or other soft tissue metastases; the remaining 2 demonstrated both skeletal and non-skeletal metastases. No detectable radiographic calcification was present in any of the 4 patients in whom non-skeletal metastases were seen on bone scans. Of the 16 patients who had both bone scans and radiographs, 3 patients demonstrated skeletal metastases, and these lesions were recognized on both examinations. Radionuclide bone and liver scans frequently demonstrate metastatic lesions in patients with known medullary carcinoma of the thyroid gland. (no Refs)

17. TWO CASES OF LYMPHOMA OF THE PAROTID GLAND FOLLOWING ABLATIVE RADIOIODINE THERAPY FOR THYROID CARCINOMA.

Wiseman JC, Hales IB, Joasoo A
Royal North Shore Hosp., St. Leonards, NSW, 2065, Australia
Clin Endocrinol (Oxf); 17(1):85-89 1982

Two adult patients are described whom 131I therapy for thyroid carcinoma was followed by the development of non-Hodgkin's lymphoma in salivary glands. Histologically one was lymphocytic and the other histiocytic. The total doses of 131I given were 27 GBq (675 mCi) and 14 GBq (350 mCi), lymphoma presenting 10 and 3 yr respectively after the initial therapeutic dose of 131I. We suggest that the relationship is a causal one, because of the rarity of salivary gland lymphoma and the high dose of radiation to the salivary glands with this mode of therapy. (Author abstract) (14 Refs)

18. ARE SCINTIGRAPHY AND ECHOGRAPHY OF THE THYROID SUPPLEMENTARY METHODS OF EXAMINATION?.

De Haas G, Zijderlaan Versulis E
Afdeling Nucleaire Geneeskunde en Echografie, Diakonissenhuis, Utrecht, The Netherlands
Ned Tijdschr Geneeskd; 126(9):365-371 1982

Thirty-three patients (30-74 yr old) with thyroid changes were subjected to scintigraphy with 99mTc pertechnetate and ultrasonography, and the findings were compaed with the histological ones. Scintigraphy revealed localized or diffuse, inhomogeneous radioactivity distribution in 10/33 patients, in whom ultrasonography showed solid processes with or without signs of degeneration. The microscopic examinations revealed colloid nodular (and adenomatous) goiter. Scintigraphy showed reduction or absence of radioactivity uptake locally (cold spot) or in the entire lobe in 19/33 patients. Ultrasonography showed solid process in 16/19 patients, in whom the histological examinations demonstrated carcinoma in 3/16 cases (1 anaplastic carcinoma and 2 follicular carcinomas), adenoma in 5/16, and colloid nodular (and adenomatous) goiter in 8/16, and complex processes in 3/19, which were demonstrated to be colloid nodular (and adenomatous) goiter histologically. Locally increased radioactivity uptake (hot spots) were demonstrated by scintigraphy in 4/33 patients. Ultrasonography showed solid processes in 3/4 cases, while the histological examination revealed adenoma in 2/3 and colloid nodular (and adenomatous) goiter in 1/3. The ultrasonography showed complex process in 1/4 cases, identified histologically as colloid nodular (and adenomatous) goiter. The findings indicate that ultrasonography failed to provide any specific additional information for hot and cold nodules. (11 Refs) (In DUT)

GENITOURINARY NEOPLASMS

19. SCINTIGRAPHIC EVIDENCE FOR THE REGRESSION OF SKELETAL METASTASES FROM A HYPERNEPHROMA FOLLOWING LONG-TERM TREATMENT WITH MEDROXYPROGESTERONE ACETATE.

Minervini R, Fiorentini L, Carlino F, Mazzuca N, Mariani G
(c/o Mariani) C.N.R. Inst. Clinical Physiology, Via Savi 8, 56100 Pisa, Italy
J Nucl Med Allied Sci; 26(1):55-59 1982

A 45-yr-old male in whom regression of disseminated bone metastases from a renal carcinoma was induced by long-term treatment with medroxyprogesterone acetate (MPA) is reported. Remission of bone metastases began approx 2 mo after starting the MPA treatment as judged by serological and x-ray findings and was considered virtually complete within 19 mo of therapy. The case described appeared to meet all the criteria

showing that the patient had bone metastases from a hypernephroma and that the remission was induced by pharmacological treatment with MPA. (12 Refs)

HEAD AND NECK NEOPLASMS

20. PREVENTION OF POST-IRRADIATION XEROSTOMIA WITH SUBMAXILLARY GLAND TRANSPOSITION. PRELIMINARY RESULTS.

Bourdin S, Desson P, Leroy G, Remy P, Cuilliere J, Beauvillain C, Legent F
Clinique O.R.L., C.H.U. de Nantes, F 44000 Nantes, France
Ann Otolaryngol Chir Cervicofac; 99(6):265-268 1982

Seven patients with cancer of the pharyngeal tonsillar region, underwent contralateral submaxillary gland transposition to the submental region in order to prevent xerostomia following salivary gland irradiation during radiotherapy. Following radiotherapy, scintigraphy was used to determine secretion of the two parotids and the submaxillary gland . The level of secretion was the same before and after irradiation for four patients, and for two patients the secretion level was 50% lower but still higher than the gland that was not transposed. For these two patients, the scintigraphic activity did not seem to correspond to the subjective sensation that was perceived by the patient and the doctor. For one patient, there was no secretion. Subjectively, five patients were very satisfied and reported a sufficient saliva flow. One patient reported serious taste changes without any real salivary problems. One patient reported a very obvious decrease in saliva flow without real oral dryness. (no Refs) (In FRE)

HEMATOLOGIC, RETICULOENDOTHELIAL, AND LYMPHATIC NEOPLASMS

21. LYMPHOSCINTIGRAPHY WITH TC-99M-HSA; A NEW AND BETTER TECHNIQUE AND RADIOPHARMACEUTICAL (MEETING ABSTRACT).

Ryo UY, Kang B, Goldstein R, Kim I, Pinsky SM
Michael Reese Hospital, Chicago, IL
J Nucl Med; 23(5):20 1982

Lymphoscintigraphy has been reported as a very useful procedure in an evaluation of regional lymphatic progression of a malignant disease. Currently the most widely used agent for the study is Tc-99m-antimony-sulfur-colloid injected intramuscularly or subcutaneously. Quality of the images obtained with this technique is excellent. However, the study routinely takes 3 hours or longer, and the agent is not routinely available. In order to develop a better technique for lymphoscintigraphy, we studied usefulness of several, routinely available radionuclides and different routes of injections for lymphoscintigraphy. The lymph channels were visualized within 5 minutes after intradermal injection of Xe-133 or T1-201 using 50 uCi or less. But activity of these agents never reached high enough concentration in the lymph nodes to be imaged. The lymph system could be imaged. The lymph system could be imaged readily with an intradermal injection of Tc-99m-human-serum-albumin (HSA). While the rate of disappearance of Tc-99m-HSA in the dermis was, on the average, 10 and 5 times slower than that of Xe-133 and T1-201 respectively, progression of the stream of the lymphatic flow could be as fact as 5 cm/min. Regional lymph nodes could be imaged as early as 10 minutes after injection and the study could be completed in 30 to 40 minutes. When the injections were made subcutaneously the lymph system was not well visualized for the first 60 minutes studied. (no Refs)

MUSCULOSKELETAL NEOPLASMS

22. QUANTIFICATIONS AND SENSITIVITY IN BONE SCANNING IN THE DETECTION OF BONE METASTASES.

Ritsema GH
Radiodiagnostic Dept., Zuiderziekenhuis, Groene Hilledijk 315, 3075 ERA Rotterdam, The Netherlands
Diagn Imaging; 51(2):99-106 1982

In a prospective study the whole body retention (WBR) and several bone-soft-tissue ratios (BSR) were determined in 50 consecutive clinical patients. The scans were studied in the usual way. Three independent observers found an increased uptake in five scans. The rest activity was calculated by expressing the WBR, measured at 24 h to a percentage of the WBR measured at 5 min. It appeared that in the same five patients, being observed visually to show an increased uptake, the rest activity was pathologically higher than the rest activity in the 'normal' patients. The L2-flank ratio also differentiated in the five scans having the observed increased uptake. The same patients with an increased uptake were differentiated by three observers with the help of quantification. The extra use of the WBR and the BSR determinations in the detection of bone metastases appeared to be absent in this study. The sensitivity was not increased. (Author abstract) (17 Refs)

23. EPIPHYSEAL CHONDROBLASTOMA: CLINICAL AND ANATOMIC RADIOLOGICAL ASPECTS.

Priolo F, Carlesimo M, Consalvo C, De Franco A
Istituto di Radiologia, Policlinico 'A. Gemelli', Largo A. Gemelli, 8, 00168 Rome, Italy
Radiol Med (Torino); 68(7/8):555-560 1982

The clinical, radiological, and histological features of epiphyseal chondroblastoma were studied in 14 patients (11 men and 3 women) with such tumors. The incidence was found to be highest during the second decade of life. Pain was present in almost all cases and was of long duration, but functional limitation was seen only in those patients in whom the joint surfaces were affected. The results of laboratory tests were nonspecific. The femur, tibia and humerus combined were affected in 70% of all patients. The lesions were almost always epiphyseal or apophysial, while metaphyseal location was very rare. Roundish or oval osteolysis was seen radiologically in the epiphyseal and apophyseal tumors of the long bones. Pathological fractures were not seen. The scintigraphic and thermographic findings were nonspecific. Increased uptake seen during scintigraphy was due to reactive peritumoral sclerosis. The histological examinations revealed large numbers of round and mononuclear cells, polynuclear cells with macrophage and chondroblast activity, differentiation and chondroid development in the round mononuclear cells, and cellular and intercellular calcifications. (28 Refs) (In ITA)

24. VALUE OF THE STUDY OF THE KINETICS OF 85 STRONTIUM FOR THE CLASSIFICATION OF OSTEOGENIC SARCOMAS.

Mazabraud A, Gongora R, Gongora G, Perdereau B, Bataini P, Pouillart P, Zucker JM
Service d'Anatomie Pathologique, Institut Curie, 26, rue d'Ulm, 75231 Paris Cedex 05, France
Sem Hop Paris; 58(28/29):1664-1667 1982

Because of the polymorphism of osteogenic sarcomas, examination of a biopsy specimen, which is necessarily small, cannot give an accurate evaluation of the differentiation of the whole tumor. Therefore, a test which provides an overall assessment of the functional capacity of the tumor is needed. For the last 10 years, we have been using 85 strontium, which has a metabolism similar to that of calcium and radioactive characteristics that allow external measurements. With this isotope, classification of osteogenic sarcomas is more accurate, ensuring better therapeutic trials. (Author abstract) (11 Refs) (In FRE)

RESPIRATORY AND CARDIOVASCULAR NEOPLASMS

25. A METHOD FOR INCREASING THE SENSITIVITY OF GALLIUM SCINTIGRAPHY IN THE DETECTION OF MEDIASTINAL METASTASIS IN PATIENTS WITH PRIMARY BRONCHOGENIC CARCINOMA (MEETING ABSTRACT).

Waxman A, Ramanna L, Berman D, Kaushik D, Brachman M, Tanasescu D, Chapman D, Brown D, Sensel N, Julien P, Koerner S
Cedars-Sinai Medical Center, Los Angeles, CA
J Nucl Med; 23(5):98 1982

Gallium scintigraphy has been shown to be insensitive in detecting isolated mediastinal metastasis in patients with bronchogenic carcinoma. The lack of sensitivity is due in part to the high sternal activity which obscures underlying foci of gallium activity. The purpose of this study was to evaluate a gallium-bone subtraction Ga(S) method in an attempt to remove selectively sternal activity from underlying soft tissue structures. Twenty patients with bronchogenic carcinoma had surgical exploration of the hila and mediastinum (14) or x-ray evidence of hilar or mediastinal disease (6). Gallium scintigraphy was performed 2-5 days post-injection. Ten mCi of Tc-99m MDP was injected and a gallium bone subtraction study was begun 2 hours later. The 184 and 296 Kev photo peaks of gallium were used to accumulate a 500 k image in a 64 x 64 matrix. Immediately after the gallium image, without moving the patient, the TC-99m MDP image was accumulated in the same format. Sequential subtraction images were produced utilizing 20% increments of the Tc-99m MDP image subtracted from the gallium-67 image. We conclude that gallium subtraction scintigraphy increases sensitivity for mediastinal disease detection without substantially altering specificity. (no Refs)

26. THE STAGING OF LUNG CANCER: A COMPARISON OF CHEST X-RAY, LINEAR TOMOGRAPHY, COMPUTER TOMOGRAPHY, AND GALLIUM SCINTIGRAPHY (MEETING ABSTRACT).

Julien P, Waxman A, Birnberg F
Cedars-Sinai Medical Center, Los Angeles, CA
J Nucl Med; 23(5):20 1982

Comparisons of various imaging modalities have been discussed with respect to the preoperative staging of patients with primary carcinoma of the lung. The purpose of this study was to evaluate the sensitivity and specificity of these tests with emphasis on the comparison of computed tomography (CT) and gallium-67 scintigraphy. Thirty-four patients with known primary carcinoma of the lung were included. All patients had mediastinal exploration as well as preoperative chest x-ray, linear tomography, CT, and gallium scintigraphy. Gallium scintigraphy appears to be the most sensitive but least specific modality. CT, while far less sensitive than gallium, was more specific. Paramediastinal masses were best evaluated with CT, especially in determining the relationship of the primary mass to the mediastinum and to the chest wall. (no Refs)

27. QUANTITATIVE STUDIES OF GALLIUM 67 UPTAKE IN HUMAN LUNG TUMOURS DURING CHEMOTHERAPY (MEETING ABSTRACT).

McCready VR, Flower MA, Smythe J
Royal Marsden Hospital, Sutton, Surrey, England
J Nucl Med; 23(5):97 1982

Previous visual assessment of Gallium scans in media-stinal Hodgkin's disease suggested that the level of uptake correlated with overall prognosis. This study was undertaken to correlate quantitative measurements of Gallium uptake in 14 patients with Ca (carcinoma) lung with the effect of chemotherapy and overall survival. The Gallium uptake was measured with a dual 5' detector rectilinear scanner using a PDP8 computer. The technique was optimized for use with Gallium 67 with particular emphasis on depth independence of the detector response. Quantitative scans were performed before therapy and at 3 and 6 weeks during therapy. Results were expressed as a ratio of counts recorded over the tumor area (Cs) to counts recorded over an equivalent background area (Cb). The pretreatment ratio (Cs:Cb) was higher in the squamous cell group than the oat cell group. There was also a highly significant difference in the measured response of squamous and oat cell carcinoma to the chemotherapy. After 3 weeks therapy the percentage change in the Cs: Cb ratio was squamous cell -35% ± 33% and oat cell-106% ± 33%. In the oat cell group only the response at 6 weeks was virtually the same as the response at 3 weeks. The difference in initial activity confirms other in vitro studies of uptake being related to histology. The technique gave a useful quantitative measure of the response to therapy prior to X-ray and clinical changes. However the measured response to therapy did not help in predicting the eventual prognosis. (no Refs)

MISCELLANEOUS

28. LOCALIZATION OF I-131-LABELED GOAT AND PRIMATE ANTI-CARCINOEMBRYONIC ANTIGEN (CEA) ANTIBODIES IN PATIENTS WITH CANCER.

Sullivan DC, Silva JS, Cox CE, Haagensen DE, Harris CC, Briner WH, Wells SA
Duke Univ. Medical Center, Box 3808, Durham, NC, 27710
Invest Radiol; 17(4):350-355 1982

Thirty patients with anti-carcinoembryonic antigen (CEA)-producing cancers of the colon, breast, or thyroid were injected with 1 to 2 mCi of 131I-labeled, affinity-purified, goat or baboon anti-CEA antibodies. Images were obtained daily for four days. Computerized background subtraction using 99mTc-labeled compounds was used. Images obtained with and with-

out background subtraction were correlated with other evidence of disease. Activity levels in plasma, urine, and thyroid gland were monitored. Significant deiodination of antibody occurred within the first 24 hr. The mean plasma half-disappearance-time of baboon antibody was significantly longer than the mean half-disappearance-time of goat antibody. With exogenous blockade, total thyroid uptake was less than 0.1% of the injected dose. Without background subtraction, scintigraphic localization of known tumor was possible in one of two patients with colon carcinoma, in three of 20 patients with breast cancer, and in none of five patients with medullary carcinoma of the thyroid. With background subtraction, potential false-positive results could be generated for every patient, depending on the normalization site chosen and the degree of subtraction used. In contrast to results of previous reports, CEA-producing tumor was found to be infrequently localized using highly purified goat or primate radiolabeled anti-CEA. Furthermore, the subtraction technique described by previous investigators may lead to a high false-positive rate. (Author abstract) (7 Refs)

29. 51CR-BLEOMYCIN, A NEW ONCOPHILIC RADIOPHARMACEUTICAL. II. SCINTIGRAPHIC DIAGNOSIS OF MALIGNANT NEOPLASMS.

Liniecki J, Brykalski D, Pertynski T, Rembelska M, Durski K, Fajndt S
Dept. Nuclear Medicine, Medical Acad. Lodz, Sterlinga 5, 91-425 Lodz, Poland
Nuklearmedizin; 21(2):68-71 1982

Diagnostic scintigraphy was performed on 20 patients with malignant tumors using 51Cr-bleomycin (51CrB), 58Co-bleomycin (58CoB), and 67Ga-citrate (GaC). Malignancies included seven Hodgkin's disease (HD), five non-Hodgkin's malignant lymphomas (NHL), four cervical carcinomas (CC), one metastatic carcinoma of unknown origin (CX), one embryonal carcinoma of the testis, one prostatic cancer, and one seminoma. Each patient underwent scintigraphic examination with each radiopharmaceutical. The injected activity was 55 mega-Becquerel (MBq) for 58CoB and GaC and 555 MBq for 51 CrB. Images were recorded 24 hr after injection of either bleomycin compound and 48 hr after injection of GaC. Tumor foci were graded semiquantitatively on a scale of ND (no focal count density exceeding the background) to 5 (a focus very well defined with a count density equal to or higher than that of the liver). Clinically identified foci were detected using 51CrB in 18/20 patients; in 2 patients the images were suggestive of tumors. Scintigraphy with 51CrB identified 33/35 individual clinically positive anatomical regions. Agreement between 51CrB and 58CoB was good; differences in intensity were found in 3/9 patients. In comparison of 51CrB and GaC differences in intensity were found in 9/11 patients. Results indicate that 51CrB should be considered as a cheaper alternative to 50CoB. (5 Refs)

30. UTILITY OF LYMPHOSCINTIGRAPHY IN MANAGEMENT OF CUTANEOUS MALIGNANT MELANOMA (MEETING ABSTRACT).

Munz DL, Hor G
Dept. of Radiology, Div. of General Nuclear Medicine, University of Frankfurt/M., Frankfurt, W. Germany
J Nucl Med; 23(5):97 1982

Regional lymph node dissection is an adjunct procedure to increase the cure rate in patients with 'high risk' melanoma. However, the question arises, which regional lymph nodes drain the primary lesion. Seventy-two patients with primary malignant melanoma on the trunk, neck, head, and extremities were studied by lymphoscintigraphy prior or subsequent to surgery Tc-99m-labeled 1.5-2.0 mCi antimony sulphide colloid was injected both intradermally and subcutaneously around the primary lesion or periphery resp. center of the excisional scar. Imaging was accomplished with a gamma camera 4-6 hours following injection. In melanomas of head and neck as well as distal parts of the extremities, the regional lymph drainage proved to be predictable by anatomic guidelines. In melanomas of the trunk and proximal parts of the upper extremities, however, the direction of regional lymph flow was unpredictable but clearly identifiable by lymphoscintigraphy. (no Refs)

31. DOSIMETRY IN LYMPHOSCINTIGRAPHY OF TC-99M ANTIMONY SULFIDE COLLOID.

Bergqvist L, Strand SE, Persson B, Hafstrom L, Jonsson PE (c/o Strand) Dept. Radiation Physics, Univ. Lund, S-221 85 Lund, Sweden
J Nucl Med; 23(8):698-705 1982

A quantitative kinetic technique using a scintillation camera has been developed for investigating lymph drainage and the uptake in the lymph nodes of 99mTcSb2S3 colloid injected sc. Twenty-two patients with primary malignant melanoma were examined. Lymph-node dissection was performed and 185 lymph nodes were individually measured for radioactivity. The kinetics of colloid uptake in individual nodes can be expressed by a simple two-compartment model. The outflow of colloid from the injection site was found to be monoexponential, and the tissue volume containing the injected colloid at the injection site increased asymptotically with time. A model has been developed for calculating absorbed doses at the injection site and in organs with colloid uptake. The following absorbed doses were estimated (uGy/MBq): whole body 0.7-4.5, gonads 0-22, liver 1.0-3.9, lymph nodes up to 1,000 and injection site about 10,000. Possible biological effects in the skin and effective dose equivalents have been estimated when using other lymphoscintigraphic agents. (Author abstract) (27 Refs)

SELECTED PRE-CLINICAL STUDIES

32. KINETICS OF 57 CO-BLEOMYCIN IN SHEEP AFTER INTRAARTERIAL INJECTION IN THE HEAD AND NECK REGION (MEETING ABSTRACT).

Bier J, Loer E, Franke J
No affiliation given
International Symposium on Vascular Perfusion in Cancer Therapy, April 22-23, 1982, Giessen, W. Germany. Klinik fur Allgemeinchirurgie 55 pp., 1982.

The aim of intra-arterial (ia) chemotherapy for the treatment of head and neck tumors is to achieve higher drug concentrations in the tumor than after systemic intravenous (iv) application. Therefore it is postulated that ia chemotherapy on the one hand, leads to an increased therpeutic effect at the tumor site and, on the other, to a decrease of systemic drug toxicity. The lack of adequate animal experiments and the absence of prospective randomized clinical trials comparing ia with iv chemotherapy has led to the present kinetic study. Radioactive bleomycin (57Co-bleomycin) was injected locally (planum buccale, Group I), intra-arterially (arteria transversa faciei, Group II; arteria temporalis superficialis, Group III; arteria carotis externa, Group IV) and intravenously (v saphena, Group V) in five sheep per group. Between one and 360 minutes after injection of radioactive bleomycin the urine and the systemic blood

activities were determined and the activities in the hypothetical tumor area (planum buccale) were measured continuously. Three hundred and sixty minutes after injection the animals were killed and the activities in the hypothetical tumor area, in the lymph nodes draining this area and in different tissues and organs were determined. The results showed that ia chemotherapy compared to iv treatment is, on the one hand, not able to increase the drug activities significantly in the hypothetical tumor area and in the lymph nodes draining this area and, on the other, a decrease of systemic drug toxicity could not be detected after ia compared to iv treatment. (no Refs)

33. TUMOR AFFINITY AND DNA INTERACTIONS OF 57CO-BLEOMYCIN.

Kakinuma J, Honjo Y, Orii H

Tokyo Metropolitan Inst. Medical Sciences, 3-18-22, Honkomagome, Bunkyo-ku, Tokyo 113, Japan

Radioisotopes; 31(4):175-178 1982

Tumor affinity of two isomeric forms of 57Co-bleomycin (BLM) was studied in Rous sarcoma-bearing SR-DDD-Br mice with respect to distribution of the Type I and Type II isomers in the tumor, blood, muscles, liver, and kidneys. DNA binding properties of the isomers were studied with the aid of DNA melting. Accumulation in the tumor tissues and stability of DNA binding of Type I isomer were higher than those of Type II. (5 Refs) (In JPN)

34. 51CR-BLEOMYCIN, A NEW ONCOPHILIC RADIOPHARMACEUTICAL. I. ACTIVITY CONCENTRATIONS IN TRANSPLANTABLE TUMOURS AND ORGANS-TISSUES OF MICE.

Rembelska MJ, Liniecki J

Dept. Nuclear Medicine and Radiobiology, Medical Acad. Lodz, Sterlinga 5, 91-425 Lodz, Poland

Nuklearmedizin; 21(2):62-67 1982

Concentrations of a new pharmaceutical, 51Cr-bleomycin (51CrB) were measured in various tissues and tumors in 360 mice. The mice were injected sc in the dorsal region with neoplastic cells. Tumor types included Ehrlich ascites tumor, NK/Ly lymphoma, Lewis lung carcinoma, melanoma B-16, and sarcoma 180. The tumors were allowed to grow for 8 days, at which time tumors were palpable but did not contained necrotic foci. The mice were then injected with 30 ug or 51CrB or 58Co-bleomycin (58CoB). Mice were sacrificed after 12, 24, or 48 hr. The highest concentrations of both bleomycin compounds were found in tumors and liver tissue, followed by the kidneys and intestines. The lowest concentrations were found in blood, muscles, and bone. Among tumors, the highest 51CrB concentrations were found in Ehrlich ascites tumors. Concentrations in other tumor types were one order of magnitude smaller, with no significant differences among types of tumor. The highest concentrations of 58CoB were found in Ehrlich ascites tumors and NK/Ly lymphoma. Concentrations in other tumor types were one order of magnitude lower, with no significant differences among types of tumor. Concentrations of 51CrB were generally lower than those of 58CoB. This difference may be offset by the higher energy emitted by 51Cr. The concentration of 51CrB at higher levels in tumors, compared with other tissues, suggests that the compound is useful for scintigraphic detection of tumors. Clinical studies are therefore a warranted. (14 Refs)

35. DETECTION OF HUMAN CANCER IN AN ANIMAL MODEL USING RADIO-LABELED TUMOUR-ASSOCIATED MONOCLONAL ANTIBODIES.

Epenetos AA, Nimmon CC, Arklie J, Elliott AT, Hawkins LA, Knowles RW, Britton KE, Bodmer WF

Imperial Cancer Res. Fund, Lincoln's Inn Fields, London WC2A 3PX, England

Br J Cancer; 46(1):1-8 1982

Monoclonal antibodies to epithelial-cell antigenic determinants, labeled with 123I and 125I, were administered parenterally to immunodeficient mice bearing human tumors derived from a human cancer cell line. Anterior, posterior and lateral radioscans of the body were taken with a gamma scintillation camera at various times from immediately to 65 days after injection. Visual displays of the images were processed by standard computer techniques. The model used a human colon-cancer cell line, HT29, and the monoclonal antibody, AUA1, which is specific to an epithelial proliferating antigen. Tumor detection was achieved in all the mice. The smallest tumor detectable appeared to be about 1 mm in diameter. The degree of antibody uptake in a tumor depended on its size and the blood supply of its surrounding tissues. We believe that the technology and skills are now available for accurate radioimmunodetection of cancer in man. (Author abstract) (23 Refs)

36. COMPARISON OF IN-111 ANTI-CEA MONOCLONAL ANTIBODIES (MOAB) AND ENDOGENOUSLY LABELED SE-75 MOABS IN NORMAL AND TUMOR BEARING MICE (MEETING ABSTRACT).

Halpern SE, Hagan PL, Garver PR

University of California, San Diego, CA

J Nucl Med; 23(5):8 1982

In-111 MoAbs are stable in vitro and in vivo and concentrate well in human colon tumors expressing CEA (carcinoembryonic) antigen. The following study was undertaken to compare the distribution and tumor (T) uptake of In-111 Moab with endogenously labeled Se-75 MoAb. Anti-CEA MoAb was labeled with In-111 using a bifunctional chelation (BC) technique. The same MoAbs were labeled endogenously with Se-75-selenomethionine by the addition of this amino acid to a growing hybridoma. The labeled MoAbs were harvested and shown to have a specific activity of approximately 0.5 uCi/ug and an 89% reactivity against CEA. The In-111 antibody had a 75% reactivity against CEA. The radiopharmaceuticals were injected into normal Balb C mice and nude mice bearing CEA-producing human colon T and sacrificed at 4, 24, 48 and 72 hr. The mice receiving Se-75 MoAb had smaller tumors. Distribution and excretion studies were performed. The kinetics of In-111 and Se-75 Moab are virtually identical with the exception of slightly faster blood disappearance and slightly higher liver concentrations with the In-111 Moab. The same was true for the T bearing animals, with slightly greater T concentrations of Se-75 than In-111 MoAb. (no Refs)

37. LOCALIZATION OF HUMAN OSTEOGENIC-SARCOMA XENOGRAFTS WITH RADIO-LABELLED MONOCLONAL ANTIBODY (MEETING ABSTRACT).

Pimm MV, Dawood FA, Price MR, Perkins AC, Baldwin RW
Department of Medical Physics, University Hospital of Nottingham, Nottingham, England
Br J Cancer; 45(4):637 1982

In view of current interest in antibodies as carriers of diagnostic and therapeutic agents, studies have been carried out to examine the in vivo tumor-localizing potential of monoclonal antibody to a human tumor. Monoclonal antibody (mouse IgG2b) against a human osteogenic sarcoma 791T was isolated from hybridoma supernatant or ascites fluid by affinity chromatography using Sepharose-linked Protein A. After labelling with 125I (1 uCi/ug) the antibody bound in vitro to osteogenic sarcoma cells, but not to other human malignant cells. After injection into immunodeprived CBA mice with a range of osteogenic-sarcoma xenografts (791T, 788T, 20S) there was preferential localization of activity in tumor tissue (tumor: blood ratios 0.86-2.25) compared with muscle, bone and visceral organs. In contrast, there was no localization into xenografts of a colon carcinoma HCT-8 (tumor: blood ratios 0.43-0.57). Furthermore, no localization into osteogenic-sarcoma xenografts was seen with labelled normal IgG2b (tumor: blood ratios 0.25-0.30). With 131I-labelled purified antibody, localization into xenografts was visualized by whole-body gamma scintigraphy with computerized 99mTc pertechnetate or 113mIn-labelled blood subtraction. (1 Ref)

38. INDIUM-111 METALLOPORPHYRINS FOR LYMPH NODE IMAGING (MEETING ABSTRACT).

Robinson G, Vaum R, Staum M, Alavi A
University of Pennsylvania, Philadelphia, PA
J Nucl Med; 23(5):38 1982

Preparation and applications for a variety of radioactive metalloporphyrins have been described. Most studies have been aimed at theraputic applications. This work evaluates the potential of three In-111 labeled porphyrins as lymph node imaging agents after IV administration. In-111 labeled tetra(N,N,N-trimethylanillinium)porphyrin (TTAP), tetra(N-methyl-4-pyridyl)porhyrin (TMPyP), and tetra(4-sulphanatophenyl)porphyrin (T4SPP) were prepared by heating 2 ml of acetate buffered aqueous solution containing 2 mg of porphyrin and the desired quantity of In-111 (NCA) at 115 C for 30 min. Radiochemical yields in excess of 95% resulted. Biodistribution studies by tissue assay in rats followed IV injection of 100 uCi (100 ug porphyrin) with sacrifice at 1, 4, 24, and 48 hr. Scintillation camera imaging studies in rabbits followed IV injection of 200 uCi (200 ug porphrin) with anterior views being taken at 4, 24, 48, 72, and 96 hr. Distribution patterns were similar with all agents showing early renal and hepatic uptake. In rats, In-111 TTAP had maximum lymph node to muscle uptake ratios which averaged 85:1 between 24 and 48 hr post injection. Total lymph node uptake was 1% at that time. Lower absolute nodal uptakes and uptake ratios were found for the other derivatives. Nodes were clearly visualized at 48 hr with both labled TTAP and TMPyP but they were not seen with TMPyP on subsequent images and were never seen with T4SPP. (no Refs)

39. UPTAKE AND METABOLIC FATE ON N-13 AMMONIA AND GLUTAMINE IN GLUTAMINASE SENSITIVE AND RESISTANT MURINE TUMORS (MEETING ABSTRACT).

Rosenspire KC, Gelbard AS, Cooper AJ, Schmid FA, Roberts J, Young CW
Memorial Sloan-Kettering Cancer Center and Cornell University Medical, College New York, NY
J Nucl Med; 23(5):37 1982

This study was undertaken to determine whether there was a differential uptake of N-13 activity after the injection of N-13 ammonia and L-(amide-N-13) glutamine between transplanted murine tumors known to be resistant (ROS tumor) or sensitive (S-180 tumor) to glutaminase therapy. The metabolic fate of the N-13 activity glutamine was also determined in these tumors. The N-13 activity in 1 week old tumors was measured at various times after injection of N-13 ammonia and glutamine. Uptake of N-13 activity from ammonia and glutamine was higher in the ROS than in the S-180 tumor. However, the ROS has twice as large a blood volume as the S-180 indicating that the tumor uptake may be a function of blood volume. Preliminary findings by HPLC (high pressure liquid chromatography) analysis showed that for both tumors 5 minutes after N-13 ammonia administration, most of the N-13 metabolites were present as urea, neutral amino acide and ammonia. The S-180 contained more N-13 ammonia than the ROS, suggesting less utilization of ammonia by the S-180. After N-13 glutamine administration the S-180 had twice the amount of N-13 neutral amino acids as the ROS, while the ROS had four times the amount of N-13 urea. Results of this study show that not only is the uptake of ammonia and glutamine different in these tumors, but that their metabolism differs as well. (no Refs)

40. THE EFFECT OF CERTAIN VARIABLES ON THE TUMOR AND TISSUE DISTRIBUTION OF TRACERS. VI. FALSE-CARRIER EFFECT, PART III, FE.

Stern PH, Halpern SE, Hagan PL, Chen A
Nuclear Medicine Service, Veterans Admin. Center, San Diego, 3350 La Jolla Drive, San Diego, CA, 92161
Invest Radiol; 17(4):386-393 1982

Previous work has shown that Fe+++, when administered in the proper dose and time sequence, increases the tumor uptake of gallium-67 (67Ga) while decreasing its uptake by normal tissues. The purpose of this series of experiments was to examine further the postulate that the false carrier effect is mediated at the cellular as well as the vascular level, determine the lowest concentration of ionic Fe+++ that will induce near max tumor/background ratios (T/Bkg), determine the best technique for its administration, and decide whether Benadryl and dexamethasone could be used to offset side effects of the Fe+++ without altering tumor and tissue kinetics. Fe3+ altered tissue levels of 67Ga prior to changes in the blood. The threshold for initiation of the false-carrier effect varied to some extent from one organ to another. Tumor uptake of 67Ga was either enhanced or unaltered at 4 hr after injection; 0.3 mg Fe+++/kg administered 0.5 hr before and 2 hr after the 67Ga enhanced 4-hr T/Bkg by a factor of about 10. Twenty-four-hr ratios were improved (to a lesser extent than 4 hr), but decreased concentrations of 67Ga occurred in the tumor. Dexamethasone and Benadryl did not alter the outcome of the experiment. This technique should be useful for imaging with gallium-68 and the PET camera. (Author abstract) (20 Refs)

41. ESTROGENIC RADIOIODINATED DIHYDROXYSTILBENES FOR SCINTIGRAPHIC EVALUATION OF PROSTATIC CARCINOMA (MEETING ABSTRACT).

Wiebe LI, McGowan DG, Lentle BC, Flanagan RJ, Gati L
University of Alberta and Cross Cancer Institute, Edmonton, Canada
Third European Symposium on Radiopharmacology, April 23-24, 1982, Noordwijkerhout, The Netherlands Society of Nuclear Medicine Europe; 1982

The monohydroxy-monomethoxy-, dihydroxy-, and dimethoxy derivatives of (z)-1,2-bis(4-methoxyphenyl)-1-iodopropene, a new potent diethylstilbestrol (DES) analogue, have been synthesized and labelled with I-123, I-125 and I-131 for in vivo testing. Tissue distribution, whole-body elimination, and scintigraphic (imaging) studies were carried out in normal male Wistar rats and in Copenhagen rats with subcutaneously implanted Dunning 3327A and Dunning 3327H prostatic tumors. All three derivatives were shown to undergo general distribution, with some concentration in liver, tumor and pancreas. Elimination of radioactivity occurred in hepatic and renal routes. Uptake of radioactivity by the unblocked thyroid glands was taken as evidence for metabolic deiodination. (no Refs)

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